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ARE INSTITUTIONS FOR INFANTS NECESSARY?*

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In considering the best conditions for the relief of acutely sick infants and for foundlings or abandoned babies, two important factors must always be kept in mind: (1) the unusual susceptibility of the infant to its immediate environment, and (2) its great need of individual care. The best conditions for the infant thus require a home and a mother. The further we get away from these vital necessities of beginning life, the greater will be our failure to get adequate results in trying to help the needy infant. Strange to say, these important conditions have often been overlooked, or, at least, not sufficiently emphasized, by those who are working in this field.

The subject naturally divides itself into two branches — the treatment of the acutely sick infant in a hospital, and the care of the foundling or abandoned infant in an asylum.

We will first consider the hospital. An important point to emphasize is that the stay of an infant in a hospital should be as short as possible. The reasons for this are obvious to those who have had much experience along this line. Unless the infant is quickly discharged after the acute symptoms have subsided, there is nearly always a slow but progressive loss of weight which bears an inverse ratio to the age, being especially marked under six months. If this atrophy gets beyond a certain point no change of environment or food will save the patient.

Another danger consists in the spread of specific infections, such as diphtheria, pertussis and the exanthemata. A child may be admitted in the late incubation period, and, if so, is apt to involve many others. These infections may also be brought by mothers or other visitors, acting as carriers. It is now considered that these diseases are spread by contact rather than by aerial transmission, hence the nurses and the children themselves may spread the poison from one to another. When any one of these diseases gets a foothold in an institution it is hard to stamp out the trouble without discharging all the patients in the affected ward, cleaning up the place and starting fresh with new cases. Otherwise, one patient after another will gradually succumb to an exposure from others who may be in the period of late incubation or early invasion. Measles and pertussis are particularly to be mentioned in this connection. Young children with nasal catarrh, enlarged tonsils or adenoids may harbor diphtheria bacilli that remain latent, which accounts for their being attacked without apparent hetero-infection, or, if not succumbing themselves, spreading the disease to others.

Perhaps the greatest danger in keeping sick infants long together, comes from the ordinary ward infections. The mucous membranes usually bear the brunt of these infections. We may thus have rhinitis, pharyngitis, tonsillitis, otitis media, bronchitis, bronchopneumonia and vaginitis. The latter is nearly always specific. It is generally the infants who have been longest in the hospital who succumb to these cross infections. The pneumococcus and streptococcus seem to cause most of the trouble, although, in certain seasons, the influenza bacillus is also very active. Hospital babies show a poor resistance to added infections; their immunizing power against bacteria and other infections seems to be largely lost after a certain length of time in an institution. The infants must thus be discharged at just the right time, when the acute symptoms have subsided and before the cachexia of hospitalism has had time to develop. In a word, in order to insure a good convalescence the infant must be kept in a hospital for only a short time; it must be carefully guarded from auto- and hetero-infection while there, and, finally, sent out to recuperate under as favorable conditions as possible.

I do not believe that the multiplication of infant's hospitals through the country should be encouraged. When infants need hospital care it had better be in small units. The dangers of cross infection must be guarded against by the most skilful nursing as well as by working in small units. There should be one good nurse to three or four sick infants so that there may be a chance effectually to apply the principles of aseptic nursing. Particularly at night, the nursing is too often ineffective from not having enough nurses in attendance. Large wards and large institutions are undesirable as far as the infant is concerned. Atrophic infants with chronic indigestion and malassimilation should never be treated in a hospital. A baby with marasmus will rarely live long in an institution. It is interesting in this connection to glance at the recent action of the Massachusetts Infant Asylum. This institution had developed two rather distinct branches of work — (1) the care of sick babies in its hospital at Jamaica Plain; (2) the placing of well babies at board in private families under the supervision of trained nurses. Later, a department for looking after unmarried mothers and a wet nurses' directory were added. As it seemed wise to revise this wide field of service, the hospital was discontinued and an arrangement

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made with the Boston Dispensary by which a certain number of beds were retained for babies who might need hospital care before going to board, or such as become sick while at board. The hospital feature of the work was thus reduced to a small unit and the boarding out system emphasized and enlarged. This is a step in the right direction. That more can be accomplished with sick infants by home treatment than has ordinarily been supposed, even in severe cases, provided proper nursing can be furnished, is shown by the figures in the accompanying tabulation, which have been furnished me by the Henry Street Settlement, New York:

RESULT OF HOME TREATMENT OF SICK INFANTS

PNEUMONIA				
Birth to 2 years	1910	1911	1912	1913
Cured	986	1,251	1,423	1,596
Died	114	181	177	206
Total	1,100	1,432	1,600	1,802
DIARRHEAL DISEASES				
Birth to 2 years	1910	1911	1912	1913
Cured	249	339	263	273
Died	30	40	27	25
Total	279	379	290	298

As these figures run through a series of years, they should form a fair general average, and it is doubtful if any hospital can furnish as good results. They were all cared for at home and attended by their own physicians, but skilfully and carefully nursed by the trained nurses from the Settlement. If necessary, several visits a day were made until convalescence was fully established.

When home attention is impossible and the hospital care required, the best results will be obtained by an early discharge with a proper "follow-up" system by a competent nurse. In this way the best and most permanent results will be obtained.

The next aspect of this question concerns the care of foundlings or abandoned infants in institutions. There is a sharp distinction to be made between hospital care for the acutely sick infant who cannot get proper home treatment, and the ordinary infant asylum. Both have high death-rates, but the latter starts and deals with a well, or comparatively well, baby, who gets sick or loses vitality during its stay in an institution. This makes a radical difference. I believe the plan of collecting babies in institutions should be abandoned, as, on the whole, doing more harm than good. Not only is the mortality under this system very high, but the surviving infants are rarely strong and healthy. In spite of good intentions and care in management, too often these institutions produce or aggravate the very conditions they are supposed to prevent. The danger of institutional care to infants is in inverse proportion to their age, being very great under one year and diminishing as the children grow older. This experience is world-wide, and it seems strange that more energetic steps have not been insisted on, especially by the medical profession, in the line of abandoning these old and futile methods. It is fair to state, however, that some of these institutions are waking up to different plans of action. In a historical sketch of the Foundling Hospital of London, it is stated that in 1756 a basket was hung at the gate in which children were deposited after ringing a bell. It is naively added that of 14,934 children received during three years and ten months, no less than 10,389 perished in early infancy. It is interesting to note, by contrast, that the infants on reception are now placed out to nurse with cottagers in the Kent or Surrey districts under the superintendence of medical officers and are returned to the hospital about the age of five. During 1910, 48 infants were received, of whom only two died under one year, and one under two years after being boarded out in the country.[1]

In a personal letter from the general secretary of Dr. Bernardo's Homes, the largest charity in England dealing with infants, the following statement is made:

> Years ago we established a large institution especially for babies, called our Babies' Castle. Accommodation was provided for 100 babies. The place was beautifully designed and perfected in every detail, but we found that the babies did not thrive and eventually we had to board them out and use the institution in question for those who were a little older. Our experience leads us to the conclusion that a large segregation of babies under one roof is fatal to their well-being and health, however carefully and well they may be looked after. . . . We do not hesitate to say that if a certain number of babies were first of all to be boarded out under good conditions and then segregated under one roof, it would be found that the death-rate would be four times increased in a year or two.

In a minority report of the British Royal Commission on Poor Laws, 1909, it is stated that the mortality among infants in the poor law institutions is between two and three times greater than that found in the general population. It is said:

> Out of every 1,000 babies born in the population at large, 25 die within a week and 132 are dead by the end of the first year. For every 1,000 children born in the poor law institutions, 40 to 45 die within a week, and, assuming the mortality among those who are discharged to be the same as those remaining, no fewer than 268 or 392 will be found to have died by the end of the year, the number varying according to whether we take the experience of the poor law institutions for legitimates or for illegitimates in the metropolis, or elsewhere. . . . The excess of infantile mortality in the poor law institutions is actually greater at the ages between 1 and 6 months, than during the first month of life. . . . It may well be that human infants, like chickens, cannot long be aggregated together, even in the most carefully devised surroundings, without being injuriously affected.

The facts learned by many years of observation and experience on this problem do not seem to be sufficiently appreciated by many in this country. If so, the large asylums and institutions for the care of foundlings and abandoned babies, would be abolished, with a consequent lowering of the infantile death-rate. In a monograph issued by the Division of Child Hygiene of the New York Board of Health, it is stated that during 1910, 42 per cent. of the total deaths of babies under 1 year of age in the Borough of Manhattan took place in institutions (inclusive of both foundling asylums and general hospitals).

In order to get a general idea of the usual death-rates in institutions that house many infants, I made a study of the statistics of ten of these asylums located in different cities as follows: New York, Buffalo, Boston, Providence, Philadelphia, Baltimore, Washington, Detroit, St. Louis and New Orleans. The time covered varied from four to twenty years, taking the shortest and longest intervals. The rates were based on the ratio between yearly admissions and deaths and were as follows: 53.17 per cent.; 40.6 per cent.; 40 per cent.; 60 per cent.; 31.7 per cent.; 75 per cent.;

1. Report of Foundling Hospital, London, 1910.

65.8 per cent.; 47.7 per cent.; 36.1 per cent.; 49.5 per cent. In all but one of these institutions the deaths included all infants under 2 years. As the greatest mortality is under 1 year, the showing would be worse if restricted to this age. The following figures taken from one of these institutions exemplify this point: During 1907, 320 were admitted; of these, 147 died under 1 year and only 18 between 1 and 2 years. During 1908, 417 were admitted, and of these, 113 died under 1 year, and only 12 died between 1 and 2 years.

There is no doubt that the figures cited above give a fair average of the mortality when young infants are collected together in numbers and treated in mass. The high mortality is not so much due to lapses in care or details in management as to the system itself, which fails because it is wrong. As a contributing cause, however, it may be mentioned that rarely, if ever, is sufficient individual care given to infants in institutions. As a result, the condition of those who live is apt to be decidedly below the proper development for the age. It is only fair to say that many babies sent to these asylums are in poor condition from neglect and hardship — sometimes even moribund — but still it is equally true that a very much larger proportion could be saved by a different method of handling them.

This consists in placing them in individual homes where the many risks and dangers of the institution will not exist, even though the domicile be crude and rough. The baby will do better here in the long run than in the most immaculate ward, but visiting and watching will be required. The full benefits of boarding out cannot be obtained without proper and continuous oversight, preferably by a trained nurse. This constant supervision is rarely carried out as it should be under the direction of a physician. Thus in one institution, about 700 boarded-out babies are looked after by only four visiting nurses. In this case, it is manifestly impossible to be sure that the babies are receiving the proper medical and hygienic care.

Boarding out must be more systematized and the same detail and routine that are usually employed in institutional work should be applied here. Twelve years ago I instituted a plan of boarding out atrophic or abandoned babies in which the following features were emphasized: (1) Boarding out in a certain district of the country noted for its healthful conditions. (2) Constant attention to diet and hygiene on the part of a physician and nurse who are thoroughly familiar with this class of cases and competent to deal with them. (3) The infants are kept as long as necessary, until feeding is regulated and digestion and assimilation are improved sufficiently to result in an increase in weight. The work is kept up during the whole year and not limited to certain seasons. (4) The training in a given neighborhood of a number of foster mothers, who, by constantly taking these infants into their homes, become fairly expert in handling them under conditions totally unlike those offered by the best institutions and far superior to them. This work has been in successful operation ever since under the control of the Speedwell Society at Morristown, N. J.

This plan can be employed in any place, with such variations as may be required by the special locality. Thus in a large city it may be best to work in distinct districts which can easily be overseen by some one familiar with the neighborhood and its people. This means a more intensive working in many small fields, but all cooperating in a common system. A few small collecting stations that would act as clearing houses can take the place of the large institutions and furnish the doctors and nurses necessary to carrying on the work. A vast field can thus be covered, but the actual work must be done in small units, each represented by a certain district or locality. Relief will thus be instituted along the lines of family life, with individual supervision, instead of the collective life with institutional methods.

The unit of civilization is the family which offers the healthiest physical environment. The most susceptible member of the family to all external conditions is the infant. When transplanted from natural and normal conditions, the little ones quickly droop and suffer most. We must see to it that relief is afforded in the most natural and effective way to these unfortunates who come under our care. For this reason the infant asylum must go. Cottages must take the place of barracks. An increased knowledge of the real needs of infant life will not tolerate the old methods much longer, for a larger and wiser human spirit is at work on these problems, which is not content to put up with evils that can be avoided. If the present workers in this field will not improve their methods, then some future generation with wider vision, truer courage and broader human feeling will accomplish this needed reform.

EXPERIENCES OF THE NEW YORK HEALTH DEPARTMENT IN TYPHOID IMMUNIZATION

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Preventive medicine, despite its brilliant advances in recent days, has met momentary checks, when, as happens from time to time, some apparent instances of its failure to protect from disease have come to light. That element of our lay population which suffers from constitutional timidity and which can be induced only with difficulty, if at all, to adopt the teachings of this newest and most helpful branch of medicine, jumps eagerly at these apparent examples of failure. It makes them serve as justification for relapsing into the helpless and fatalistic attitude toward disease which has come down through the centuries from the dark ages. These particular instances of the so-called miscarriages of prophylactic medicine are trumpeted far and wide and marshaled to serve as evidence against its value, long years after impartial scientists have disproved all criticism and vindicated the signal virtues of this newest department of medical science.

Error and hasty and mistaken conclusions die as hard to-day as ever in the history of scientific progress. In common with every method of treatment that has ever been inaugurated, antityphoid prophylactic treatment has been opposed at each step of its progress by criticism which has sometimes been ignorant, or unscholarly, or malicious, or even all of these. Rus-

sell has already paid his compliments to these groups. This study of antityphoid immunization is therefore offered to answer unsound criticism as recently expressed in connection with a series of cases that received conspicuous notices in the New York press. Also it aims to give to those general practitioners who have read the necessarily insufficient and confused comments on these cases in the lay press and even in some of the medical journals a knowledge of facts interpreted scientifically, that they may in their praiseworthy office as teachers be reassured and reinforced in their belief in the value of this protective measure, and may impart with renewed enthusiasm and conviction the full measure of their belief to their pupils—the public.

THE EARLY HISTORY OF ANTITYPHOID VACCINATION

Almost simultaneously in 1896, Pfeiffer and Kolle in Germany, and Wright of Netley, England, published the results of experiments in the prevention of typhoid fever by vaccination with *Bacillus typhosus* killed by heat.

For several years preceding, a group of workers including Dunbar, Fränkel, Simmonds and Stern, had been occupied with the problems of immunology in typhoid fever. Wright made an extensive application of these experiments, vaccinating large groups of men in the British army. His results were not as favorable as had been expected, and the procedure met a setback until Leishman, who had been working with Wright, again essayed the use of this prophylactic measure on a large scale on the men in the Indian service of the British Army. He had concluded that their failure to achieve the success they had anticipated in their first trials was due to a superheated vaccine. This fault was corrected and Leishman's work gave a new impetus to those interested in the subject.

When, subsequently, Wright announced his theory of the negative phase, and the increased risk of infection with typhoid fever, during the period of this phase, progress for a time was again checked. The cumulative, practical experience of Leishman, however, enabled him to refute this theory most emphatically, and to prove conclusively that whatever force it had was more theoretic than real, and "that the most important evidence must come from actual practice, rather than from laboratory experiment." Indeed, Pfeiffer and Friedberger disproved this in laboratory tests on guinea-pigs, as did Leishman in 100 cases at the Baring asylum. Wright himself since 1909 has receded from this position to a very great degree.

In 1911, Major F. F. Russell, than whom there is no more competent authority on this subject in this country, had so far advanced its use among 20,000 men in the United States army that he could assert of those using it that "we knew that the preparation we were using was harmless; we knew too that it caused few severe reactions in *healthy persons*, and that no vaccination, however severe the immediate reaction may have been, had been followed by permanent injury to the individual; and *further that by all laboratory tests the immunity conferred was identical with and equal to that remaining after typhoid fever.*"* The brilliancy of the results achieved by Major Russell at San Antonio, and subsequently, on an even larger scale in the army, results which now have become almost classical, led to the enactment of the compulsory anti typhoid vaccination law by the United States government.

In France, in 1913, a similar law was passed, making vaccination against typhoid fever compulsory in the French army.

Fully 85 per cent. of the men in the Indian service of the British army have been vaccinated, although no legal compulsion has been employed by the British government.

In the years that have elapsed since 1896, the evidence of the value of this measure is undoubted, and has grown overwhelmingly; so that when the death-rate in the United States was 16.5 per hundred thousand, that in the United States army during 1912 was 0 per hundred thousand. Further examples selected from this accumulated testimony, as they bear on the analysis of our cases, will follow. Well has Russell said, "Our experience since 1909 has left no doubt about the success of antityphoid vaccination in the army and navy. The measure has come to stay."

THE VACCINE—DESCRIPTION AND MODE OF PREPARATION

The prophylactic injections that have been in use have been differently prepared by the various men who have administered them: Leishman in the British army and Russell in America, as well as most other Americans who have employed this procedure, have used a single strain (the Rawlings strain) which is of low virulence. The French prepare a polyvalent vaccine of as many as ten strains, consisting mainly of those found in the neighborhood where an outbreak of typhoid exists. Even in America, some, like Hunt in Troy, Pa., have employed a polyvalent vaccine in which has been included the *B. paratyphosus* A, and *B. paratyphosus* B of Gaertner. Needless confusion in the minds of those not familiar with this subject has been caused by the description of these and a variety of other preparations of vaccine.

Metchnikoff and his pupil, Besredka, for instance, have used a vaccine consisting of an emulsion of living typhoid bacilli sensitized by antityphoid serum. Up to 1913 this vaccine, first employed on chimpanzees, was injected into 800 persons in an institution, without any case developing after its use. One soldier in Africa so treated died of typhoid fever, but Metchnikoff explains this as being due to a dose that was entirely too small. Also, forty-eight patients with pronounced typhoid fever were treated with this vaccine. But the consensus of opinion is that aside from the danger of producing carriers, it is far safer to use the sterilized single Rawlings strain of low virulence, which has proved so brilliantly effective in England and the United States.

Chantemesse has produced an antityphoid serum obtained from horses, which has not been approved of by others.

The New York Board of Health vaccine conforms in every particular but one to the army vaccine; the exception being that phenol (carbolic acid) has been substituted for trikresol as a preservative, because of the lessened pain caused by its injection.

The culture used by the Department of Health is prepared at its Research Laboratory and is made as follows:

"A laboratory culture of typhoid bacilli which has lost much of its virulence through long artificial cultivation is used. Large surfaces of agar in Blake bottles are inoculated from fresh agar cultures. After twenty-four hours' growth

* Italics, the author's.

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at 37 C. the bacteria are washed from the surface of the agar with normal salt solution. The suspension is then standardized by counting the bacilli by the Wright method. This is done by mixing an equal part of blood and the bacterial suspension. Smears are made from this mixture and stained. The number of bacilli and red cells are then counted under the microscope in about twenty-five fields. When the proportion between the two has been determined, the number of red cells per c.c. being known, the number of bacilli per c.c. can then be estimated; this suspension is then heated one hour at 56 C., to kill the bacilli. After heating, the sterility of the suspension is tested by inoculating generous amounts into media and incubating these under aerobic and anaerobic conditions. If no growth occurs, 0.25 per cent. of carbolic acid is added to the suspension which is diluted with 0.25 per cent. carbolic acid in normal saline solution so that one c.c. contains the appropriate dose. It is then bottled for distribution."

CASE REPORTS AND COMMENTS

Whenever we add to the sum of our knowledge and experience, we describe a larger circle to embrace the new as well as the old, and so in this study, even if we contribute little that is essentially new, we believe it well in what follows to include a review of much that has gone before, so that a comprehensive and better correlated picture may the more vividly appear.

In the following are presented the histories of the cases whose atypical features offer several problems of interest, and which have prompted this survey of the work of the New York Department of Health in the field of antityphoid prophylactic treatment.

It will be noted that they fall into four classes:

Class 1. In which death has been attributed to antityphoid inoculation, and was really due to another cause, the prophylactic treatment being a mere coincidence.

Class 2. Severe reactions within a few hours after treatment.

Class 3. In which immunization was partial and insufficient, the patients having been long exposed and already in the stage of incubation when treatment was begun.

Class 4. In which a complete course of prophylactic treatment failed to give immunity, and was followed after a relatively short interval by an attack of the disease.

CLASS 1. COINCIDENCES

CASE 1.—C. P., aged, 25, a member of the National Guard, received three injections of antityphoid vaccine in January, 1914. He reacted very moderately to these injections, and for several weeks thereafter continued in good health. Early in March, that is, two months after immunization, he became ill, and the physician who attended him diagnosed his illness as influenza. Just before his death, which occurred March 30, 1914, another physician who was called in diagnosed his case as typhoid fever, and so certified in the death certificate he issued.

Acting on the protest of the surgeon of the regiment to which the patient had been attached, the Department of Health refused to accept the death certificate, and a necropsy was therefore ordered.

April 2 the coroner's physician performed the necropsy, and established the absence of typhoid lesions. The heart was found to be the seat of a malignant ulcerative endocarditis. The skin showed petechiae, and septic infarcts were found in various parts of the body, the kidneys particularly.

This case, in which malignant endocarditis ran such a deceptive clinical course that the physicians in attendance were led to believe they were dealing first with influenza and then with typhoid fever is of a type not unfamiliar in clinical medicine and which frequently remains obscure as to diagnosis until it reaches the necropsy table. Such an erroneous charge against typhoid vaccination as this needs no further refutation. The entire lack of logical sequence between vaccination and the ultimate cause of death is clearly evident.

It is reminiscent, however, of the early history of small-pox vaccination, in which, in the case reported by Broeckerhoff, the Jennerian operation was followed by an illness which was held to be small-pox, and because it resulted in death, seemed, until cleared up by necropsy, an aspersion on vaccination, Death in this instance proved to be due to hemorrhage from a typhoid ulcer, and not to the use of vaccine. So once again, it is interesting to note how consistently history repeats itself.

CLASS 2. SEVERE REACTIONS

CASE 2.—A clerk in one of the divisions of the Department of Health was injected one afternoon with antityphoid vaccine, and it was noticed that on withdrawal of the needle a free stream of dark blood followed. This was interpreted to be due to the puncture of a vein. Not more than half an hour later, he was seized with sudden faintness, his skin became pale and clammy, he complained of headache, showed dulness of intellect, and temperature of 103. These symptoms did not last more than a few hours, and the next day he was up and about ready to return to work. The entrance of the vaccine directly into the venous stream was held accountable for the train of symptoms; but no lasting or serious results remained.

Occasionally an urticarial rash on the chest and abdomen, lasting for a week, has been reported, as has also herpes facialis following these injections.

HISTORIES OF CASES 3, 4, 5, 6 AND 7

Introduction.—Mr. M. arrived at his home in Brooklyn from a business trip through the Southern states, April 23, with a history of illness of ten days' duration. Mr. M.'s physician submitted a specimen of his blood for a Widal test to the New York Department of Health, and on April 25 he was informed that it gave a positive Widal reaction.

At noontime, May 3, in compliance with Mr. M.'s request, the physician administered an immunizing dose of Department of Health vaccine to each of the four presumably well members of the family, consisting of his wife and three children, Ruth, Herbert and Raymond. May 16, Mr. M. died. Mrs. M.'s sister, a Mrs. R., who was present when the prophylactic injections were administered, also received one.

CASE 3.—Mrs. R., the sister-in-law of Mr. M., returned to her home in New York, a distance of at least five miles, and subsequently stated that she had been feeling "very sick" that night. She called no physician to see her. No temperature record or other competent observations were made at the time. She was entirely well in two or three days and able to perform her regular duties. Her case is mentioned because, in association with the four that follow, it served to inspire the criticism and detraction of a few organs of the lay press and, forsooth, of a medical journal too. In common with Herbert M. and Ruth M., whom Mrs. R. brought to her New York home, five miles distant, directly after they had received prophylactic injections, she made a journey, the length and fatiguing nature of which were contra-indicated after immunizing treatment.

Cases 4, 5, 6 and 7 will be briefly mentioned in this class and again in the next, because they illustrate both the phenomenon of a severe reaction, and the futility of preventive inoculation when administered during the period of incubation.

CASES 4, 5, 6 AND 7.—These four cases are those of Mrs. M. and her three children, two of whom, Ruth, aged 4½, and Raymond, aged 6 years, made the long trip to New York with their aunt. Within twelve hours after their injection all are reported as having been "very sick," but temperatures were

not taken, and no more precise and detailed clinical notes are on record as to this particular period than is contained in the foregoing incomplete statement of symptoms. Mrs. M. felt well again within two or three days, and continued nursing her husband. The other children also showed but a temporarily severe reaction, with an interval of comparative moderation in symptoms, preceding the conditions to be outlined in that part of the history which is assigned for description in the next class.

In these five cases in which severe reactions were reported to the family physician by the patients themselves, several factors were operative. First, the comparatively long journey to New York made by three of those treated; secondly as will appear from the subsequent history, the M. family so treated were not in good health and probably then already in the period of incubation of the disease.

Of this class, characterized by severe reactions that ensue at any time, either immediately after the injection of an immunizing dose of vaccine, or from twelve to forty-eight hours later, much may be said by way of impartial critical comment.

Practically our entire navy has been vaccinated without a single serious result or casualty being noted; and less than 1 per cent. of the men were obliged to rest in bed or be excused from duty as a result of the reaction that followed.

Russell in 128,903 cases observed severe reactions as follows:

After the first dose, 0.3 per cent. in 45,680.

After the second dose, 0.2 per cent. in 44,321.

After the third dose, 0.1 per cent. in 38,902.

Authoritative writers define a severe reaction as one characterized by a temperature of from 103 to 104, malaise, vomiting, diarrhea and chills.

Spooner, in 400 cases, noted severe reactions in 4 per cent.; moderate reactions, consisting of malaise, headache and a temperature of not above 100.5 in 10 per cent., and very slight or absent reactions in 86 per cent.

Hachtel and Stoner of Baltimore immunized 1,326 persons with an absence of symptoms of distinct reaction in 1,160, or over 87 per cent.

Malaise appeared in 775.

Headache appeared in 835.

Muscular pains appeared in 106.

Nausea and vomiting appeared in 60.

Chills appeared in 57.

Temperature rise appeared in 884.

A study of the temperatures gave the following results:

Temperature normal to 101 in 785.

Temperature from 101 to 103 in 82.

Temperature over 103 in 17.

In 1,945 persons on whom they employed a monovalent strain of vaccine, they found that 95.8 per cent. had normal temperature or only a slight rise; in ninety-nine on whom the polyvalent vaccine was used, a normal or slight elevation of temperature was observed in only 80.7 per cent. In other words, severe reactions seem more likely to follow a polyvalent vaccine.

Ravenel of Wisconsin vaccinated 1,900 and noted mild reactions in all but two, who after receiving their third injections had drunk heavily.

Weston, in an experience with 898 persons to whom he administered prophylactic treatment, found a severe reaction after the first dose in 883; a severe reaction after the second dose in 880, and a severe reaction after the third dose in 895.

Of those who received this treatment in the French army, at home and in Africa, severe reactions were noted only in those who were ill or fatigued at the time of the injection, this, despite the fact that a polyvalent vaccine (consisting of ten strains) was employed.

Dr. John W. Brannan, using the New York Department of Health vaccine at Bellevue Hospital on 200 nurses, fifty of the physicians on the house staff, and also on a few male patients in his private practice, reports that of these, only three nurses asked to be relieved of their duties for one day, several interns had a rise of temperature as high as 102, and one doctor had a temperature of 103, with headache and abdominal pain after each of two doses.

Rukke of St. Louis, vaccinating 11,007 cases, giving 33,021 injections in all, noted severe reactions in eighty-seven who, in conformity with practice in the United States army, had received simultaneous smallpox vaccinations. Of these eighty-seven, 50 per cent. had vaccinia reactions or reaction from measles or other infectious diseases. Only one case of musculospiral neuritis developed in an officer as the result of trauma to a nerve. He asserts, on the basis of experience in the families of officers living in the camps, that children bear the inoculation well, even at as early an age as 3 years.

Pensuti, using higher doses of vaccine than those generally employed, vaccinated eight children (from 7 to 12 years of age), without subsequent trouble.

All these citations are to show that the occasional occurrence of a severe reaction has been acknowledged and understood by all competent authorities. The severity of these reactions is determined, as already mentioned, by debility from illness (tuberculosis, etc.), marked fatigue, alcoholism or undue exertion in those subjected to prophylactic treatment. In other instances, injection of the vaccine directly into a vein, or its intramuscular administration, has accounted for very marked reactions.

In civil, as distinguished from military communities, whenever a case in which a severe reaction has appeared has been given publicity, it is usually a professional brother who helps spread misinformation with the benevolent suggestion that a contaminated or improperly prepared vaccine has been responsible for such serious result. This charge, if true, is indeed a grave one. Let us examine it: The heating of the suspension of bacilli that is used in preparing the vaccine, at 56 C. (132.8 F.) and the subsequent inoculations into mediums incubated under aerobic and anaerobic conditions to test the sterility of the suspension, together with the final addition of 0.25 per cent. phenol, would surely preclude contamination. The only organisms that might then possibly be present as contaminating ones, would be the tetanus bacillus or staphylococcus. The presence of these organisms could surely be recognized—the tetanus organism by the characteristic symptomatology resulting from its action, and the staphylococcus by a localized infection at the site of injection. From the history of the cases thus far given, and as it subsequently appears, it will be clearly apparent that neither of these contaminations of the vaccine were present.

All those who are acquainted with the character and the organization of the Research Laboratory of the New York Department of Health, will feel assured that the vaccine is prepared with every caution and safeguard against contamination. Moreover, Drs.

Curran, W. S. Hubbard, F. Harnden, C. R. Love and Dudley, of Brooklyn, employed vaccine of the same stock as the foregoing on members of their own families and on private patients without a single severe reaction or untoward result.

CLASS 3. PARTIAL AND INSUFFICIENT IMMUNIZATION

The history of Cases 4, 5, 6 and 7 is resumed under this classification because after the severe reaction caused by the single injection, which each of these patients received, and the short interval of freedom from complaint that ensued, the symptoms of typhoid fever made their appearance in each case.

CASE 5.—Ruth M., aged 4½ years, became ill May 7, and was brought back to her home in Brooklyn, from New York, by her aunt. The temperature became high (about 104) and hovered about that point for a number of days, while signs of severe meningeal irritation supervened, that is, marked opisthotonos, stupor, muscular rigidity and loss of sphincter control—justifying the name frequently applied to typhoid, *Nervenfieber*. Lumbar puncture, performed May 20, proved negative for meningococci, and the spinal fluid was clear and under considerable pressure. A blood count at this time gave the following results: Polymorphonuclears, 41 per cent.; small lymphocytes, 47 per cent.; large lymphocytes, 9 per cent, mononuclears, 3 per cent.

The Widal test showed agglutination in dilution of 1:60 in ten minutes; 1:120 in ten minutes; partial agglutination, 1:500 in ten minutes; complete in thirty minutes; partial agglutination, 1:1,000 in thirty minutes; complete in one hour.

May 22, an examination of the feces showed typhoid bacilli. There was no doubt therefore that this was a case of typhoid fever which became manifest shortly after a single injection of antityphoid vaccine. The patient subsequently made a complete recovery.

CASES 6 AND 7.—The other children, Raymond, aged 6 years, and Herbert, aged 11 years, also developed symptoms of typhoid fever several days after they had recovered from their severe reactions. Raymond's case ran a brief and uneventful course. Herbert had a moderately severe attack of several weeks' duration with a relapse. These two also made complete recoveries.

CASE 4.—Mrs. M., the mother, who had been assiduously nursing her husband until the time of his death, May 16, and then had similarly cared for her children, kept at her work even when initial symptoms of typhoid fever had made their appearance. Like so many ambulatory cases, the date of onset of her illness could not be definitely established. Despite malaise and an increasing feeling of illness she continued her household duties and the care of her children until June 13, when her physician reported her ill with typhoid fever. On June 15 she died of intestinal hemorrhage.

Clearly this unfortunate family continuously and intimately in contact with a typhoid fever case for a number of days, before a single vaccine injection was attempted, had incubated the typhoid bacilli too long to make effective the antagonistic and immunizing power of antityphoid vaccination.

A study of the third class of cases assumes special importance, because it raises the question whether it is a safe and proper practice to vaccinate those who are much exposed in an epidemic, or in intimate contact with typhoid fever cases, in the capacity of medical attendant or nurse. Here too, isolated examples are of no value in helping one to arrive at a judgment of the value of prophylactic treatment, and one must perforce utilize all available records from authoritative sources, and from such cumulative evidence derive one's conclusions.

It was in connection with this type of case that Wright offered his theory of the negative phase, and expressed his disapproval of antityphoid inoculations during the period of its presence. His theory and the arguments in its support were based on laboratory experiments, and when they were first promulgated, many excellent clinicians were persuaded by their apparent validity to oppose such prophylactic treatment during epidemics. A characteristic example is McCrae who, in his article on "Enteric Fever" in Osler's "System," said, "It is evident that it would not be wise to vaccinate during an epidemic, as the procedure apparently makes the individual less resistant to infection for a time."

As has already been stated in a previous section, Leishman in a series of practical tests conducted on 100 individuals exposed at an asylum, made observations that refuted Wright's theoretic views, and in this he was seconded by a goodly number of careful clinicians and laboratory workers. Of the latter, Pfeiffer and Friedbergers' experiments were particularly valuable.

Cullinan of Dublin, a pupil of Wright, inoculated 500 persons at the Richmond asylum during an epidemic of typhoid fever that lasted five months, and only 1.35 per cent. contracted the disease; and those who came down with it were already in the incubation stage. Of the 114 uninoculated nurses, 14.9 per cent. developed typhoid fever.

Spooner inoculated 29 out of 65 persons in a small Vermont town, at a time when 17 had already been brought down by an attack. Of these 29 only one person (3.5 per cent.) contracted typhoid fever, whereas of 19 who had refused vaccination, 5 developed the disease—26.3 per cent.

Hunt, who in 1912 took charge of the situation in Troy, Pa., where an epidemic was in progress, and who, judged by his report at the time, is not an enthusiast as to antityphoid prophylaxis, found 1,343 persons who had been definitely exposed. Of 761 who accepted vaccination and were well at the time of the first injection, a total of 37 (4.86 per cent.) developed typhoid fever. Of these 37 cases, 28 occurred after the first injection, 7 after the second and 2 after the third injection. Contrast with this the 582 who were not vaccinated and among whom 65 (14.28 per cent.) came down with enteric fever. Whatever his deductions from the facts observed may have been, his testimony, taken together with that of others, seems strongly to argue for a decided protective action of the vaccine even in the presence of an epidemic. Even his mortality statistics would tend to confirm one's faith in the value of protective inoculations, for, of the 37 cases that appeared among the vaccinated, there was but 1 death (0.27 per cent.) as opposed to 17 (8.85 per cent.) among the 65 unvaccinated. Hunt takes issue with Spooner, who believed that there was an acceleration of the onset in the infected vaccinated cases. The former contends that the incubation period was prolonged, and the onset consequently delayed until many days after the second inoculation in four cases, and until seven days after inoculation in another case. The evidence which these particular cases furnish strongly offsets, in Hunt's opinion, the prompt appearance of typhoid fever in 11 cases after the first inoculation.

Nor are these by any means isolated instances in which antityphoid vaccination during epidemics gave an excellent account of itself. It has been recognized that the exposure of hospital attendants, nurses, etc.—particularly nurses who do night duty—predisposes them to typhoid fever, in many cases, quite as much

as would an epidemic. Observations made on this group, therefore, are of telling value. Also it should be borne in mind in this connection that nurses are known to be many times more liable to contract the disease than are the others of a city's population; Joslin and Overlander of Boston have found that the incidence of this disease is from eight to twelve times greater among them; while Hachtel and Stoner found the rate among this group of workers for five years in Baltimore, 500 per ten thousand nurses and hospital attendants, or from twelve to twenty times greater than in the city generally. Yet at the Massachusetts General Hospital, where immunization was carried out for three years, the morbidity was only 1.4 per cent., or 19 cases in 1,361, even including nurses on night duty. In Baltimore, likewise, the institution of vaccination abolished the disease among the nurses (among 82 nurses during five years who had not been vaccinated, 7 or 8.5 per cent., contracted typhoid fever).

Ravenel, in a small town in which an epidemic was at its height, vaccinated 116 persons, and not one new case appeared thereafter.

Wright and Leishman vaccinated at Maidstone, when an epidemic had attained its maximum intensity, and with success. At Torrington, Conn., of 80 nurses who were employed, 45 accepted vaccination and remained free from the disease, while of 35 who refused the treatment, 3 cases subsequently developed.

Peterson reports that in one house in which the sanitary conditions were of the worst, there were 14 occupants of whom 7 were down with typhoid fever. The remaining 7 were immunized and no further cases developed.

From this summary of statistical data, which could be greatly enlarged on, it must appear that the fear of a negative phase, and the withholding of immunization from those closely in contact with typhoid fever cases, is not grounded on sound and logical reasoning. The experiences of scientific and conservative observers combine to prove the merit of this prophylactic procedure, and should commend it as a duty to those charged with the care of the community's health, wherever and whenever typhoid fever appears in its midst.

Moreover, the freedom with which conservative clinicians in constantly increasing numbers employ the vaccine as a therapeutic measure, to moderate the severity of this disease when already established, and to diminish its mortality rate, should serve to dispose of any distrust of its effects, which still lingers in some quarters. Wright believes that through its use, *the incidence of typhoid fever is diminished about one-half, and the mortality rate still more.* These statements are not to be construed as a support of those who believe in the therapeutic efficacy of the vaccine, for that is still *sub judice.*

Hornor's studies in the therapeutic employment of the vaccine in 40 of 135 cases, while they show no decided advantage from its use as a curative agent, exhibit, however, no evidence that could in any manner be construed as an argument against the safety of its administration. In addition, the restricted scale on which he has employed it cannot make his experience serve as more than a preliminary experimental note. Compared with Wright's extensive experiences, the limitations of Hornor's report can be better understood.

Russell further reports that in the navy, one mild case followed the second injection. Another man at Guantanamo, Cuba, received one dose, and two days later complained of headache, had a temperature of 104.6 and manifested dulness of intellect. In twenty-four hours he became rapidly worse. He died seventy-six hours after admission to hospital, and seven days after vaccination. The necropsy showed that he was at the beginning of the third week of the disease. The infection was one week old when the single dose of vaccine had been administered. Ambulatory cases are notorious for developing severe symptoms late in the course of the disease, and for their high mortality rate.

The case exemplifies strikingly the manifest difficulty of determining in these exceptional instances whether typhoid infection has already gained a foothold, and is like the cases of Mrs. M. and her daughter Ruth, as recorded in the preceding case reports.

In the *Lancet,* W. Broughton-Alcock reports the use of living sensitized typhoid bacilli (in contradistinction to the killed bacilli employed by Wright and Russell) in 750 persons, in whom he found it innocuous.

Major Russell in a report in May, 1914, says, "The conclusion is inevitable that the prophylactic vaccine as used in the army has given almost absolute protection against typhoid fever, without producing untoward effects of any character, showing definitely that the vaccination is both efficient and harmless." Those who make the point of their criticism the failure of vaccine to confer *absolute immunity,* despite the exposure of some patients to exceptionally large doses of typhoid bacilli, or debilitation which has made the body's resistance to the organism ineffective, are unrelenting and unreasonable judges who will be satisfied with nothing less than perfection. Aside from personal idiosyncrasies which may determine failure to produce antibodies, it must be conceded that exhaustion, or the implantation and growth of a virulent strain of typhoid bacilli may have gained too great a headway to be offset by one or more immunizing doses of vaccine. Even small-pox vaccination, the brilliant achievements of which are accepted by scientists, occasionally fails to confer immunity. Likewise, the administration of diphtheria antitoxin may be deferred so long that the body of the patient is overwhelmed by toxins, and no amount of this effective agent can neutralize the effects of the poison; or, if an antecedent exhausting illness makes the body a ready prey to the virulent diphtheria toxins, it outstrips the neutralizing antitoxin, and the patient succumbs. And yet, though not infallible, diphtheria antitoxin, and possibly, too, the prophylactic use of tetanus antitoxin and antirabic treatment, will continue as our most potent weapons in those diseases. There is scarcely a potent therapeutic measure that has not its limitations or contra-indications.

CLASS 4. FAILURE OF IMMUNITY

This class embraces the cases in which a course of immunizing treatment has been completed, and in which the patients are, nevertheless, after a relatively short interval brought down with an attack of typhoid fever. Here opponents of this measure have found a fertile field for criticism. And it would seem to those not familiar with the literature of the subject that in this particular a significant and incontrovertible objection to immunization has been advanced.

CASE 8.—Among a group of cases that developed in October, 1913, in a neighborhood on the lower east side, where

infection had been spread through the milk supply, there were four cases in an Italian family, affecting the mother, a Mrs. C., and three of her children. Through the visits of two married daughters and their children, three additional cases developed in their respective families. A third married daughter, a Mrs. L., whose history illustrates the theme under consideration, also visited quite frequently but was prevailed on to accept prophylactic treatment. Accordingly, two doses of 500 million (killed typhoid) bacilli each, were administered, on October 15 and 25 respectively. November 6, 1913, a final dose of one billion bacilli was injected. These were administered by the Department of Health representatives. All went well with Mrs. L. and her family until March, 1914, when her four children, each in turn came down with typhoid fever, in the following order: Rocco, aged 10, March 10; Theresa, aged 4, March 19; Louis, aged 8, March 19, and Daniel, aged 12, March 29. Subsequent examination of the stools of the grandmother, Mrs. C., at the Research Laboratory, showed typhoid bacilli. She had been the carrier to whom the infection of these cases was traced.

Mrs. L., aged 30, who was about three and a half months pregnant at this time, nevertheless devoted herself assiduously for a number of days to nursing her children and attending to household duties at the same time, until the children were sent to Bellevue Hospital. Despite the fatigue and weakness induced by her overexertions, she continued daily to visit the children at the hospital. (The children ultimately recovered).

April 1, 1914, subjective symptoms of marked lassitude and headache appeared. These Mrs. L. attributed to her pregnancy and gave them no further heed, although they steadily became worse during the second week. At this time sharp cramps developed in the right lower quadrant of the abdomen and persisted despite active catharsis. For four days prior to April 21, her headache, fever, abdominal pain and vomiting grew constantly worse. April 21 she was admitted to the service of Dr. W. Gilman Thompson of the Second Medical Division of Bellevue Hospital. The Widal was positive and a blood count showed 5,000 leukocytes (polymorphonuclears 78 per cent.). The spleen was enlarged and an atypical roseolar eruption was present. April 24, at about the fifth month of gestation, she miscarried, as pregnant typhoid fever patients so often do, but this had no influence on the temperature or the course of the disease. Dr. Thompson from his clinical study of the case diagnosed it as one of typhoid fever. April 28 she died. It is to be regretted that no blood cultures during life, or from the viscera after death, had been made. At necropsy, characteristic typhoid lesions were found in the bowels. Peyer's patches in the ileum were greatly swollen, indurated, red and showed ulceration; the spleen was considerably enlarged.

The case of Mrs. L. is then one of a series in which a debilitated condition (in this case from pregnancy and the worry and fatigue incident to nursing her three children affected with typhoid) together with a prolonged exposure to exceptionally large doses of typhoid bacilli overwhelmed the defensive powers of the individual and allowed the infective agent to become dominant.

CASE 9.—Miss E. G., aged 29, a nurse doing settlement work on the lower east side of the city, was immunized in June, 1913, and though frail of body worked very hard, nursing, among many others, several typhoid fever patients. In April, 1914, she again nursed several patients of typhoid fever, devoting herself with great energy to their care. April 30, 1914—nearly one year after immunization—she noted definitely the onset of malaise, headache and general pains. May 5 she entered the Post-Graduate Hospital with marked febrile symptoms. May 6 a Widal was negative, but a blood culture showed typhoid bacilli. May 11 the Widal was found positive in a dilution of 1:80 (no higher dilutions were attempted). In the meanwhile her temperature at the beginning of the second week showed the typical continuous elevation, varying only between 104 and 105 F. May 20 she died from intestinal hemorrhage.

CASE 10.—Miss D., aged 23, a nurse at the Presbyterian Hospital, received three successive doses of antityphoid vaccine prepared at the hospital, July 1, 11 and 22, 1913, respectively. After nursing a particularly severe case she became ill April 27, 1914, with fever, headache, pains in the back and limbs, and sore throat—that is, nine months after immunization. She continued at her work for several days, despite the indisposition caused by the initial symptoms. On May 2 the Widal test was found suggestive in dilution of 1:20, and negative in dilution of 1:100. Again, May 7, the Widal was positive in a dilution of 1:20, and suggestive in 1:100. May 13, typhoid bacilli were found in the blood. Her temperature curve was an atypical one showing fluctuation in the second week between 98.8 and 103.5, reaching 105 at the end of the fourth week, and then continuing its large excursions. After a stormy period of eight weeks she recovered.

Again one turns to the record of Russell's experiences, and there one finds a telling and satisfying answer in quotations from his writings already given, where he says that "by all possible laboratory tests, the immunity conferred was identical with and equal to that remaining after typhoid fever."

To place the problem here presented in different words: If, notwithstanding an attack of typhoid fever, thoroughly authenticated by laboratory and clinical diagnostic tests, there still may follow a second attack of the disease at some later period, even though it is commonly taught and accepted that one attack confers immunity for life, then why should immunity obtained by vaccination be deprecated and tabooed if a like exceptional recurrence follow its practice? That vaccination gives immunity to great masses of those exposed, is most eloquently attested to by the vigorous and severe test it has received in our army and navy among more than 200,000 men. And this should outweigh overwhelmingly the criticism that an occasional exception has evoked. From the literature we shall first cite the reports of recurrences of typhoid fever, and then compare them with the reports of typhoid fever cases subsequent to vaccination, remembering that it is currently held that the latter confers immunity lasting from two to two and one-half years, according to Firth of England. Martha Wollstein, it may here be observed, is quoted as believing in revaccination after one year, though this is contrary to Firth's and Russells belief in a two or two and one-half years' immunity as noted in their extensive experiences in India and the United States, respectively.

1. Some reports of recurrences are as follows:

Dreschfield in over 2,000 cases at the Hamburg General Hospital reports that fourteen were affected twice, and one three times.

In 500 of Osler's cases in which special inquiry was made as to the history of a previous attack, eleven, or 2.2 per cent., were found in which it had occurred.

W. T. Cummins and P. K. Brown found that of 149 of their cases nine had relapses, one of them occurring four weeks after the patient left the hospital; one other patient developed a second attack after six years.

As to relapses, Strümpell reports that they occurred in 9 per cent. of all cases of typhoid fever at Leipsic; Murchison, 3 per cent.; Griesniger, 6 per cent., and Shattuck as high as 16 per cent. McCrae in 28,057 collected cases found 2,493 (8.8 per cent.); while in 172 of his own cases relapses occurred in 11.4 per cent. Why these relapses should occur is a question at once difficult and not in place here to consider, except to indicate that Durham's explanation of the evolution and unexpected dominance of a heretofore

subordinate and quiescent strain or family of *Bacillus typhosus* is quoted with approval by McCrae.

2. Directing our attention to the occurrence of typhoid after a complete course of immunization, we find the following instances recorded in the literature:

Russell reported twenty-seven cases of typhoid occurring among the men of our army and navy, with one death, the result of intestinal hemorrhage. Of these twenty-seven cases of infection in vaccinated persons, four cases developed in less than one month after vaccination; eight cases developed within three months after vaccination; six cases developed within six months, and over three months after vaccination; six cases developed within twelve months, and over six months after vaccination; two cases developed within eighteen months, and over twelve months after vaccination; two cases developed within twenty-four months, and over eighteen months after vaccination; in three cases the interval was unknown.

Here again, the relatively long period elapsing between the time of vaccination and the appearance of infection would argue powerfully against the theory of a negative phase, if further argument were needed.

Hunt, as already mentioned in a different connection, among 761 who were vaccinated, found two in whom typhoid fever followed the third injection.

In the Massachusetts General Hospital, 1,361 were vaccinated, and but two cases of enteric fever developed (a morbidity of 0.15 per cent.) against eight cases in 674 non-immunized persons (a morbidity of 1.19 per cent.). At this institution, of the two cases that developed, both were in nurses, one of whom a year after inoculation cared for two patients outside the hospital, and developed a severe attack, but recovered. The other nurse was free two years after vaccination, but then became infected from typhoid material that accidentally entered her mouth.

Here, then, to summarize the results of this review of the literature, are facts obtained from two different angles, which, brought to a focus, show distinctly that whether it is by an attack of typhoid fever, or by the prophylactic injection of killed typhoid organisms, the immunity acquired by great masses of individuals can be safely depended on, in the one case for a protracted period or even a lifetime, in the other case for a period of from two to two and one-half years or even longer.

When it is seen that in those inoculated, a great decrease in morbidity and mortality as contrasted with uninoculated groups of a population results, then indeed is enthusiastic belief in its value justified. Experiences many times multiplied, like those of Wright at Ladysmith, confirm one's faith in its protective power. Of 1,705 persons whom he inoculated, only 2 per cent. contracted typhoid as against 14 per cent. among 10,529 uninoculated persons; and again elsewhere, where of 19,069 inoculated, 266 cases of typhoid (1 in 84.4 persons) developed with a mortality of 17 per cent., while among 150,231, 3,739 cases (1 in 40 persons) developed with a mortality of 25 per cent.

No better statement of the present day attitude on the subject of the possibility of obtaining absolute immunity through antityphoid prophylactic treatment could be given than is contained in a letter of Major Russell written from Vera Cruz to the Department of Health, Aug. 10, 1914, and received after this article had been written. We here take the liberty of inserting quotations from it:

As you will note (in the article written in June, 1912, in the *American Journal of the Medical Sciences*), there was one fatality among the 27 cases, and that from hemorrhage.

Twenty of the 27 cases occurred within one year of vaccination, probably because of the greater exposure of recruits to all kinds of infection than occurs among older soldiers. *It is evident that the vaccine cannot be expected to give absolute protection, even in the period immediately following it.* To be sure, it does protect in almost every instance, but the exceptions are frequent enough to prevent our claiming absolute protection. There is no perfectly satisfactory explanation of the occasional failure to protect. We know, of course, that clinical typhoid is not infrequently followed by relapse, and that the disease may occur twice in the same person. It may be due to an excessive dose of infectious material, as in milk epidemics, or among nurses, or to the apparent impossibility of obtaining a high degree of immunity in certain persons.

I do not believe we are justified in promising absolute immunity even for a short period; we can state, however, that the chances of infection among vaccinated persons is extremely small and that when infection does occur, the prognosis is decidedly better than among the unvaccinated (1 death in 27 cases).

We feel very confident that the vaccine protects against the average dose of infectious material, but we have always doubted its power to protect against excessive amounts. While it is true that the protection conferred is not absolute, that is no reason for not using it in dispensaries, hospitals and among contacts as much as possible.

Not a single case of typhoid fever has occurred among the troops with whom I am serving, since they were first mobilized in Texas over two years ago; we are not exposed, however, to milk epidemics to any great extent, since the use of canned milk among troops, while in the field, is almost universal.

It is earnestly desired that all experiences of private physicians in this community, along the lines above indicated, be sent to the department that it may cooperate in their investigation and proper classification, with a view to correlating the mass of testimony to serve for future guidance.

The experiences of the New York Department of Health as here offered indicate that in a civic community no conclusive or valuable study, such as of prophylactic antityphoid injections, is possible, unless the Department of Health can serve as a clearing house to which the facts of isolated experiences of individual physicians are sent, and through which they pass as a well-ordered, logically arranged whole.

GENERAL CONCLUSIONS

1. The accurate observations recorded in hundreds of thousands of cases leave no doubt as to the preventive powers of antityphoid vaccination in all but a relatively insignificant few.

2. In those subsequently affected it strikingly decreases the morbidity and the mortality.

3. Severe reactions, if one makes observations from extensive studies (the only correct way), are rare.

4. To avoid severe reactions one must observe carefully several precautions, as follows:

(*a*) Never administer it to any but the healthy.

(*b*) To permit of slow absorption, avoid puncture of a vein, or intramuscular injection.

(*c*) Clean syringe and sterilize the area for injection, using tincture of iodin for the latter purpose.

(*d*) Children especially are to avoid exposure to the sun following treatment.

(*e*) Avoid administering it during the menses or pregnancy.

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(*f*) Allow no hard work or indulgence in alcohol after the injection.

(*g*) Avoid reinjecting in indurated areas.

5. Severe reactions have never left permanent injury.

6. When the incubation period has begun, the time for antityphoid immunization has passed. The treatment is preventive of typhoid fever, and not a typhoid antitoxin.

7. Long exposure to overwhelming doses of typhoid bacilli (in those who are in close contact with cases and especially in epidemics), may nullify the immunizing powers of antityphoid vaccine, and an attack may therefore follow one or more injections.

8. Chronic illness (tuberculosis, etc.), as well as debility from other causes, and fatigue and exhaustion as well, predisposes to severe reactions.

9. Injections after intimate and long exposure hasten the onset.

10. For a period of at least two years, and possibly more, immunization is as effective in protecting from an attack of typhoid fever as is a previous attack of the disease itself.

11. Recurrences may follow after a complete immunizing course of treatment, in exceptional instances in which debility and fatigue exhaust the resistant and defensive powers of the body, and when exposure to massive doses of typhoid bacilli exists.

Thankful acknowledgment is made of suggestions and assistance received from Dr. John S. Billings, director of the Bureau of Infectious Diseases of the Department of Health.

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THE PATHOLOGY OF THE MISTAKEN DIAGNOSES IN A HOSPITAL FOR ADVANCED TUBERCULOSIS *

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"Progressive medicine recognizes that among the most helpful aids to the advancement of the work of our profession are the critical analysis of errors, either in diagnosis or treatment, the frank discussion of mistakes, and the unremitting investigation of the reasons why procedures in current practice fail."[1] The following confession and analysis of errors is made in this spirit, and further to add its iota of emphasis to the importance of the correlation of clinical and pathologic data. An important purpose of the necropsy is surely lost if it is not observed at least indirectly by the clinician that he may learn of his mistakes or strengthen his convictions.

In the 198 necropsies that have been performed at the Boston Consumptives' Hospital since its foundation, twenty-three cases, or 11.5 per cent., have proved to be non-tuberculous, in so far, at least, that there was no active lesion. The report is not to be construed in any sense as a criticism of the clinical staff of the hospital. It is thoroughly appreciated that under the conditions, in a number of the cases, the diagnosis of tuberculosis was the logical one, and further in their defense it might be stated that seven of the twenty-three cases they recognized ante mortem as being non-tuberculous and five others were under observation only one, two or three days, so that there was no opportunity for close study. They all had been diagnosed tuberculosis, however, by some physician at some time to account for their reference to this institution.

It is not to be supposed that this percentage of error extends to all the cases that have been treated in the hospital. It would be lowered by those cases of undoubted tuberculosis that have been discharged otherwise than dead and further, greater effort has been made to obtain permission for necropsy in those cases of special interest and obscurity, among which have been the majority of the non-tuberculous. It does mean, however, that a total of 1,365 hospital days have been usurped by these proved non-tuberculous from the needy tuberculous of the long waiting list that is always a feature of hospitals of this nature. This is a point of considerable economic importance, not so much to general hospitals as to the special institutions receiving sums of money for the specific purpose of attempting to care for the large group of tuberculous humanity.

These cases are not presented in great detail because of their number, but just those points from the clinical and pathologic protocols are given that are of correlative interest including the clinical diagnosis, color, sex and age. They are grouped and briefly discussed on the basis of the chief pathologic findings.

CASE 1 (No. 1346).—White woman, aged 48. Clinical diagnosis, acute pericarditis; fibroid tuberculosis. In hospital but one day. Cough and expectoration intermittently for twelve years. Fever, palpitation and precordial distress on admission. Dulness over left apex; few fine, moist râles through left lung; sibilant on right. Heart enlarged to left; friction rub at apex; pulsus paradoxus. Sputum negative for tubercle bacilli.

Necropsy.—Acute fibrinous pericarditis (pneumococci and streptococci); late stage of a resolving pneumonia; dense contracted scar at left apex, 3 by 2.5 cm.; mucopus in bronchi; syphilis apparent from changes in aorta and liver and the presence of amyloid histologically.

CASE 2 (No. 1862).—White woman aged 53. Clinical diagnosis, carcinoma and gangrene of lungs. Patient was in hospital but two days. Seven months before, a carcinomatous breast was removed. Cough began one week later. She raised large amounts of fetid, blood-streaked sputum that was negative for tubercle bacilli. There were several frank pulmonary hemorrhages. Dulness over upper portions of both lungs, and lower posterior of right. Numerous and various râles throughout both sides. In addition, there were signs of cavity in right axilla.

Necropsy.—Unresolved and organizing pneumonia; gangrene and abscesses of lungs; bronchopneumonia and encysted empyema at right base. No carcinoma or tuberculosis.

CASE 3 (No. 1925).—White man, aged 38. Clinical diagnosis, pulmonary tuberculosis, revised to unresolved pneumonia. Sudden onset, two weeks before admission, with chills, cough and cyanosis. Signs of consolidation over greater portion of left lung. Pericardial friction rub. Sputum negative for tubercle bacilli.

Necropsy.—Lobar pneumonia; empyema (left chest); purulent pericarditis.

CASE 4 (No. 2617).—White man, aged 22. Clinical diagnosis, pulmonary tuberculosis; empyema; gangrene of lung; lumbar abscess. For three months suffered loss of weight and strength; severe cough and abundant sputum, positive for tubercle bacilli on one examination. An empyema was

* From the Pathological Laboratory of the Boston Consumptives' Hospital, Mattapan, Mass.

1. Deaths Following Anesthesia, editorial, THE JOURNAL A. M. A., April 4, 1914, p. 1098.

drained surgically and abscesses developed in lumbar muscles and left groin. Dulness over both lungs, especially the right; râles.

Necropsy.—Unresolved and organizing pneumonia; chronic empyema and secondary multiple abscesses; general amyloid.

CASE 5 (No. 2838).—White man, aged 43. Clinical diagnosis, pulmonary tuberculosis, bronchiectasis; chronic interstitial nephritis. Patient was in hospital but two days. Cough for one month, gradually increasing in severity, at times raising quantities of sputum, occasionally fetid, in which one tubercle bacillus was found; afternoon temperature and increasing prostration. Both lungs were dull throughout and fine and medium moist râles were heard. A trace of albumin, coarse and fine granular casts in urine.

Necropsy.—Unresolved croupous pneumonia in both lungs, with areas of gangrene; ulcerative bronchitis; chronic interstitial and degenerative nephropathy.

CASE 6 (No. 2914).—White man, aged 26. Clinical diagnosis, pulmonary tuberculosis; bronchopneumonia; empyema. Eight months before death, was admitted to a general hospital after having suffered a severe chill and pain in right side. From the cough, blood-streaked sputum, marked physical signs in the chest that later developed and the Roentgen ray, a diagnosis of "pneumohydrothorax" was made. A quantity of purulent fluid was drawn from the right chest. Patient was discharged, but later readmitted with same symptoms, the bloody sputum being a more prominent feature. Tubercle bacilli were found in sputum and he was transferred to this institution. While here, he had several frank hemorrhages, and one tubercle bacillus was found after extended search. Signs of consolidation and fluid were still present and the right chest was aspirated on several occasions.

Necropsy.—Chronic adhesive pleuritis of right lung, walling off a large pocket of pus. The lung was entirely denuded of pleura over this area, the parenchyma itself ulcerated, a number of small vessels exposed and rather free communication between empyema cavity and bronchi established. No evidence that this was a tuberculous process could be found either grossly or microscopically. The lung itself showed compression atelectasis. Confluent bronchopneumonia of left lung; early amyloid in spleen, liver and kidneys.

CASE 7 (No. 3142).—White boy, aged 22 months. Clinical diagnosis, pulmonary tuberculosis; tuberculosis of bronchial glands. Definite history of pneumonia five months before death, followed by a progressive loss of weight and strength, dyspnea, and hectic temperature becoming more distinctly septic in type. Lungs: Dulness over entire left chest, bronchial breathing in lower half, fine and medium râles in both lungs. After numerous examinations a few tubercle bacilli were found.

Necropsy.—A large, chronic empyema in left chest, compressing lung into a small mass along vertebral bodies. Sinuses through the atelectatic lung drained this cavity into the large bronchi and no doubt transmitted the harsh bronchial breath sounds heard during life. Microscopically, there were found a few young miliary tubercles in the compressed lung, but none in the cavity wall or elsewhere. The right was the seat of extensive hemorrhagic infarction, the emboli arising from a mural thrombus in right auricle that extended through the tricuspid orifice.

CASE 8 (No. 3179).—White man, aged 45. Clinical diagnosis, pulmonary tuberculosis (?); abscess of right lung. In hospital but two days. Sudden onset three months before death with chill. Patient developed a severe cough with expectoration. The sputum was fetid for last two months; patient did not stop working, however, till one month later. Three weeks before death, patient developed a severe pain in right side accompanied by marked dyspnea which persisted. Signs of consolidation over entire right lung, posteriorly over left. Sputum negative for tubercle bacilli.

Necropsy.—Gangrenous, non-tuberculous cavity involving practically entire upper lobe of right lung. The cavity was practically filled with masses and strands of necrotic tissue, plugs of which occluded the bronchi, masking the usual signs elicited over a cavity. Middle and lower lobes solid with late gray hepatization, showing small foci of abscess formation and gangrene. Left lung seat of hypostatic pneumonia and edema. Heart dilated.

In this group of cases, one of delayed resolution, three of gangrene and abscess, and three of empyema, all of them the complications of pneumonia, the diagnosis is particularly difficult. The physical signs are so confusing and the subjective symptoms are usually so strikingly like those of advanced tuberculosis that a differentiation in every case seems rather hopeless. Yet this is the very type of the whole series that promises the most favorable result to the proper treatment, particularly in the light of the advances made in chest surgery. To make the diagnosis still more difficult, the onset of the underlying pneumonia is often very obscure, as in Cases 1, 2, 4 and 5. The patient may even continue with his work during the sthenic stage of the infection with the impression that he suffers merely from a "cold," and not give up till the effects of an empyema, abscess, gangrene or some other complication debilitates him. This emphasizes the importance of a close scrutiny of the previous history and suggests that a number of cases of uncomplicated pneumonia must come and go without being recognized.

CASE 9 (No. 684).—White man, aged 63. Clinical diagnosis, pulmonary tuberculosis; tuberculous meningitis. Loss of weight and strength for several years; cough with scanty sputum, negative for tubercle bacilli. Dulness over right lung; râles not constant and varying from fine moist to coarse. Dyspnea toward the end and on last day rigidity of neck and Kernig's sign.

Necropsy.—Chronic interstitial nephropathy; chronic myocarditis; general arteriosclerosis; edema and congestion of lungs; moderate chronic bronchitis; cerebral anemia and edema. There was no anatomic explanation for the dulness in right chest.

CASE 10 (No. 874).—Man, negro, aged 60. Clinical diagnosis, pulmonary tuberculosis; moderate emphysema; old pleurisy and effusion at left base. Loss of weight and strength, dyspnea and cough for a year. Considerable sputum during final month, positive for tubercle bacilli. Marked dulness over both lungs and numerous coarse râles; cardiac murmurs.

Necropsy.—Chronic fibrous obliterative pericarditis; aneurysm of aorta; left chest, chronic pleurisy, hydrothorax and compression atelectasis; general chronic passive congestion; terminal bronchopneumonia.

CASE 11 (No. 938).—White man, aged 56. Clinical diagnosis, pulmonary tuberculosis; pneumothorax; aortic regurgitation; tabes dorsalis. Lost 25 pounds the summer before death. Cough for six months with copious sputum, negative for tubercle bacilli. Dulness over both apices and right base; râles throughout both lungs; subcutaneous emphysema of neck. Death followed a 2-liter pulmonary hemorrhage.

Necropsy.—Large aortic aneurysm that had eroded and ruptured into left primary bronchus. The tabetic symptoms were the result of erosion of vertebrae and pressure on the cord.

CASE 12 (No. 1241).—White woman, aged 41. Clinical diagnosis, carcinoma uteri; mitral stenosis and regurgitation; cardiac dilatation. "Pleurisy" one year before death. Loss of weight and strength; intermittent, hacking cough with some expectoration, negative for tubercle bacilli. Lungs practically free; heart enlarged and presented murmurs; uterus irregularly enlarged; acrid vaginal discharge.

Necropsy.—Mitral stenosis and regurgitation; cardiac hypertrophy and dilatation; pleural and peritoneal transudate; uterine fibroids (no cancer).

CASE 13 (No. 1461).—White woman, aged 29. Clinical diagnosis, pulmonary tuberculosis; chronic nephritis; mitral

stenosis. Pregnant. Cough for five months; moderate amounts of sputum, at times blood-tinged, which was positive for tubercle bacilli. Three months before death was in another institution for tuberculosis. Slight dulness at left apex of lungs; moderate dulness at both bases with a few moist râles after coughing. Presystolic murmur at apex. Patient died after a cesarean section performed on account of persistent headache and vomiting and suppression of urine. Latter contained albumin and casts.

Necropsy.—"Button-hole" mitral valve; pleural effusion with moderate compression atelectasis; chronic passive congestion of lungs and bronchi, mucosa of which was blood-stained; marked glomerular nephropathy. One fibrosed, non-active miliary tubercle was found histologically.

CASE 14 (No. 2046).—White woman, aged 58. Clinical diagnosis, chronic pleurisy; mitral and tricuspid regurgitation. "Pleurisy" of four years' standing; slight cough and scanty expectoration since pneumonia one year before death; palpitation and dyspnea more recently. Moderate dulness at left apex of lungs; harsh breathing and leathery squeaks through both sides. Heart enlarged to left, thrill and murmurs over entire area. Sputum negative.

Necropsy.—Right lung presents general, thin, fibrous pleural adhesions; congestion and edema of both. Marked hypertrophy of heart; chronic obliterative pericarditis; "button-hole" mitral; enormous thrombosis of left auricle.

CASE 15 (No. 3009).—White woman, aged 72. Clinical diagnosis, pulmonary tuberculosis; pleurisy with effusion; mitral regurgitation. History of pneumonia and pleurisy ten years before death; "bronchitis" eight years later; cough persistent for last year with some sputum, positive for tubercle bacilli. Palpitation and dyspnea on exertion; only occasional rises in temperature. Dulness at both apices and left base of lungs, distant breath sounds over latter. Heart enlarged; systolic murmur at apex. Edema of extremities. Albuminuria.

Necropsy.—Lungs: Chronic circumscribed empyema on right side, pleural effusion on left; compression atelectasis of both lungs; multiple hemorrhagic infarcts of both lungs from emboli from a mural thrombus in right auricle. Hypertrophy and dilatation of heart; very marked focal and diffuse fibrous myocarditis. General arteriosclerosis, passive congestion and senile changes.

This second group is made up of two cases of aortic aneurysm, four of chronic cardiac lesions and one of cardiorenal disease. The patients were all, with the exception of Cases 12 and 13, well past 50 years of age, gave the history of loss of weight and strength, cough and more or less expectoration. Objectively, the confusing factors were the râles, present in all the cases, and signs of fluid in Cases 10, 13 and 15. Well-marked pulmonary congestion and edema and pleural transudate were invariably found to explain the physical signs. Cough in persons past 50 years of age is not unusual and was a prominent feature in several of these cases because of the chronic passive congestion of the bronchial mucosa.

CASE 16 (No. 3419).—White man, aged 65. Clinical diagnosis, pulmonary tuberculosis; arteriosclerosis. Alcoholic and specific history. Severe trauma to left chest three years before death. During the last year suffered from pleurisy, and several pints of fluid were aspirated at various times. Loss of weight and strength and cough for two years. Lungs: Flatness over right chest with diminished breath sounds at base; dulness over left lung, bronchial breathing, râles. No fever at any time; sputum negative for tubercle bacilli.

Necropsy.—Malignant leiomyoma (probably primary in prostate) with nodular metastases to left lung, mediastinum, liver, pancreas, suprarenal, skin, etc. Chronic empyema and compression atelectasis on right side. Histologically, there were small foci of caseation in lungs and suprarenal, but no active process.

CASE 17 (No. 3071).—White man, aged 57. Clinical diagnosis, pulmonary tuberculosis; laryngeal tuberculosis; chronic alcoholism; exhaustion psychosis. Marked alcoholic history. "Pleurisy" three years before death. Cough and expectoration for last six months; night sweats, dyspnea, hoarseness of sudden onset, pain on swallowing, loss of weight and strength, but no fever. The throat symptoms became the prominent subjective feature. Dulness and bronchial breathing at both apices of the lungs. Tubercle bacilli were found in the sputum. Patient's mental condition required his transfer to the Boston State Hospital, where he shortly died, and to whom we are indebted for the necropsy report.

Necropsy.—Carcinoma of larynx with metastasis to lung, liver, stomach and pancreas. No tuberculosis was found.

CASE 18 (No. 2979).—White man, aged 37. Clinical diagnosis, pulmonary tuberculosis; chronic hypertrophic osteo-arthropathy. Beginning with "neuritis" eight years before death, he three years later developed pain, swelling and tenderness of ankles; later involving the other joints of extremities. Irregular thickenings and definite exostoses developed still later, particularly at epiphyses of long bones. A striking feature also was the enormous clubbing of the fingers and toes that subsided considerably in the later months. Three months before death, signs of consolidation appeared in upper portion of right lung. There was practically no cough or sputum and no tubercle bacilli were found.

Necropsy.—Chronic hypertrophic osteo-arthropathy; primary carcinoma of right lung with metastasis to brain, periosteum, kidneys, etc.

CASE 19 (No. 2734).—Man, negro, aged 59. Clinical diagnosis, pulmonary tuberculosis; right pleural effusion; carcinoma of liver. For three months suffered with pain in the right side and dyspnea on exertion; loss of weight and strength; practically no cough or expectoration; no tubercle bacilli found. Considerable serous fluid aspirated from right chest. Dulness over entire right lung and apex of left; few râles after coughing. Definite tumor in epigastrium.

Necropsy.—Right-sided hydrothorax with compression atelectasis of lung; primary carcinoma of liver with metastasis to pancreas, diaphragm, right pleura and mediastinal glands.

CASE 20 (No. 2768).—White woman, aged 55. Clinical diagnosis, pulmonary tuberculosis; carcinoma of cervix and vagina; vesicovaginal fistulas; chronic cystitis. Cough for five years; loss of weight and strength. Dulness over upper lobes of both lungs, few fine râles on coughing; signs of cavity in left lower lobe posteriorly. The carcinoma diagnosed by uterine curettings. Sputum negative for tubercle bacilli.

Necropsy.—Emphysema of lungs; moderate chronic bronchitis. In left lower lobe posteriorly, corresponding to location of cavity elicited clinically, was a mass of scar tissue 1.5 cm. deep by 2 cm. in diameter, firmly adherent to chest wall. In this mass the bronchi were considerably distended. There was a hard, ulcerating carcinoma of cervix and vagina; two vesicovaginal fistulas; chronic cystitis and ascending pyelonephritis.

In this group are five cases of malignant disease, in Case 18 primary in lung, in Cases 16, 17 and 19 metastatic in lung, and in Case 20 the lungs were not involved in the tumor process. As in the previous group, progressive loss of weight and strength were prominent features of the clinical history. Very definite physical signs were elicited over the chest, of course, in all the cases except the last because of the lung and pleural involvement with tumor.

CASE 21 (No. 1546).—White man, aged 71. Clinical diagnosis, chronic cystitis; aortic regurgitation; emphysema; acute appendicitis.

The cystitis was of long standing, following prostatectomy and repeated, careless self-catheterization. Loss of 50 pounds in weight during last two and a half years; cough,

with scanty, yellow sputum for last one and a half years, negative for tubercle bacilli. Slight dulness at apices of both lungs; a few râles.

Necropsy.—Chronic bronchitis; hypostatic congestion of lungs; aortic stenosis; chronic cystitis with ascending pyelonephritis; ruptured appendiceal abscess. The loss of weight, cough and expectoration, while in this case the result of the chronic intoxication and heart lesions, meant only one thing to the outside physician—tuberculosis.

Case 22 (No. 1591).—White man, aged 40. Clinical diagnosis, pyelonephritis; decubitus; general septicemia. For over two months there had been a loss of weight and strength following typhoid pneumonia. There were no subjective symptoms suggesting tuberculosis and, objectively, merely a few fine moist râles at both bases. The sputum was negative.

Necropsy.—Aside from calcified nodules at the left apex, the changes found were those the result of the toxemia from the pyelonephritis.

Case 23 (No. 1322).—White woman, aged 26. Clinical diagnosis, purulent bronchitis and septicemia (streptococcic); chronic peritonitis (postpuerperal). Of six months' duration, with severe pain in left chest; night sweats; loss of weight and strength. Signs of consolidation at left base. Cough and copious sputum negative for tubercle bacilli, but containing many "streptococci." Blood-culture sterile; leukocytes 25,000.

Necropsy.—Actinomycosis of lung, liver and spleen. There was no history of contagion, and the subjective and objective symptoms could easily justify a diagnosis of tuberculosis. The error was a pathologic one, in failing to recognize the organism in the sputum.

It will be noticed that there is a rather significant grouping of these cases pathologically, that twenty of the twenty-three cases fall under three heads: (1) the sequelae of pneumonia, that is, delayed resolution, abscess, gangrene and especially empyema; (2) cardiorenal disease including aortic aneurysm, and (3) malignant tumors, not necessarily of lungs (Table 1).

Because these cases do not form a heterogeneous collection of conditions but are so definitely grouped, it seems that there are lessons to be learned from them and that greater precision in diagnosis is a possibility.

TABLE 1.—CORRELATION OF ANATOMIC DIAGNOSES

	No.	Percentage of Non-Tuberculous	Percentage of Total
Pneumonic sequelae	8	34.5	4
Chronic cardiorenal	5		
Aneurysm of aorta	2	30.5	3.5
Malignancy	5	21.5	2.5
Septicemia	2	13.5	1.5
Actinomycosis	1		
		100	11.5

A very disconcerting factor with us in this series of cases has been the number of positive sputa reported. In eight of the cases have tubercle bacilli been found, and the diagnosis of tuberculosis has been made on this basis largely in spite of any doubt that had previously existed as to the true nature of the case. It is safe to say that lesions of sufficient size to discharge bacilli into the sputum were not overlooked. In two of them lesions were found microscopically, but to account for the presence of bacilli in the other six we must assume either a contamination of the patients' mouths or the bottles or a confusion of the specimens and names, a possibility among a large group of patients from whom a number of specimens are being collected. In cases in which the diagnosis is at all doubtful, therefore, a number of sputum examinations should be made, in institutions especially, rather than placing entire confidence in one positive finding.

With the idea of determining whether or not this institution was unique in its high percentage of mistaken diagnoses, and further to see if the distribution of these cases was accidental, letters were sent to a number of institutions caring for the advanced tuberculous asking for their (1) total number of necropsies on those clinically diagnosed tuberculosis; (2) number of these non-tuberculous, and (3) pathologic diagnoses in the latter cases. Eight institutions[1] were good enough to supply these data, which are presented in Table 2.

TABLE 2.—DATA FROM OTHER INSTITUTIONS

Institution Number	Total No. Necropsies	Non-Tuberculous	Percentage Non-Tuberculous
1	13	2	15.5
2	64	2	3.0
3	92	11	12.0
4	12	1	8.3
5	45	5	11.0
6	100	14	14.0
7	12	3	25.0
8	15	0	....
Totals	353	38	10.8

Of the 353 necropsies heard from, thirty-eight, or 10.8 per cent., were non-tuberculous. The experience, therefore, is not a local one. The distribution is not the same as our own cases, however, for the sequelae of pneumonia do not seem to have been a very prominent disconcerting factor, whereas the cardiorenal diseases have given the most trouble in the experience of these other institutions.

TABLE 3.—CORRELATION OF ANATOMIC DIAGNOSES IN THE NON-TUBERCULOUS NECROPSIES OF OTHER INSTITUTIONS

Anatomic Diagnosis	No.	Percentage of Non-Tuberculous Necropsies	Percentage of Total Necropsies
Pneumonic sequelae	3	8.0	0.8
Cardiorenal	22	58.5	6.2
Aortic aneurysm	4	10.5	1.1
Malignancy	2	5.0	0.6
Septicemia	2	5.0	0.6
Syphilis	4	10.5	1.1
Pellagra	1	2.5	0.3

It may seem radical to be sounding a warning against diagnosing tuberculosis, but it must be remembered, that we are dealing here with types of cases that are confused with those in the advanced stages of tuberculosis in which it is very unlikely to be overlooked, and that we are not considering the early stages of the disease, in which the tendency is to err in the other direction, that is, fail to recognize the presence of the infection.

The responsibility of institutions of this character does not end in providing a comfortable terminus for the advanced tuberculous, or in segregating from the public these sources of infection, but it includes also a careful scrutiny of its admissions and careful routine in the consideration of the ones admitted, with the possibility of ultimate cure or relief always in mind. This involves, of course, a correct diagnosis. While erring in this direction is more desirable than sending patients with advanced tuberculosis to a gen-

1. The cooperation of the following institutions is gratefully acknowledged: State Infirmary, Tewksbury, Mass., John H. Nichols, M.D., superintendent; Providence City Hospital, D. L. Richardson, M.D., superintendent; the Philadelphia General Hospital, Henry Sykes, M.D., late chief resident physician; Montefiori Home, New York, Dr. Wachsmann,, medical director; Kings Park State Hospital, L. I., William Austin Macy, M.D., superintendent; Tuberculosis Hospital for the District of Columbia, W. D. Tewksbury, M.D., superintendent; J. J. Kinyoun, M.D., pathologist; White Haven Sanatorium, Pennsylvania, Alexander Armstrong, M.D., chief physician; the Tuberculosis League Hospital, Pittsburgh, W. C. White, M.D., superintendent.

eral hospital, yet in justice to all patients everything should be done to bring about their proper distribution. A certain percentage of mistakes is unavoidable, but it does seem, from a pathologist's perverted point of view at least, that this should be lower than the experiences recorded above.

It is well to bear in mind that (1) a patient showing progressive loss of weight and strength, with cough, expectoration and even hemoptysis and abnormal physical signs in the chest, is not necessarily in a hopelessly advanced stage of tuberculosis, but occasionally still amenable to treatment directed to the *real* cause of the symptom complex; (2) particular attention should be paid to excluding cardiorenal conditions and pneumonia with its sequelae, and (3) one sputum examination, either positive or negative, should not be depended on to establish a diagnosis.

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CONTRIBUTIONS TO THE PHYSIOLOGY OF THE STOMACH

XXI. THE SUPPOSED ACTION OF THE BITTER TONICS ON THE SECRETION OF GASTRIC JUICE IN MAN AND DOG *

A. J. CARLSON,

ASSISTED IN PART OF THE EXPERIMENTS ON DOGS, BY MISS BERTHA TORCHIANI AND MR. R. HALLOCK

CHICAGO

We have shown (for man and dog) that the so-called stomachics or bitter tonics acting in the stomach alone have no appreciable influence on the hunger mechanism when given in the usual therapeutic quantities.[1] If the stomachics are taken by mouth in the ordinary way, all of them inhibit gastric tonus and hunger contractions in direct proportion to the intensity and duration of stimulation of the nerve endings in the mouth. If the bitters are introduced directly into the stomach in quantities considerably in excess of the therapeutic dose they all cause inhibition of the gastric tonus and hunger mechanism, evidently by stimulation of nerve endings in the gastric mucosa. In brief, the bitter tonics, in so far as they influence the hunger mechanism directly, cause inhibition or depression of hunger. According to Heubner and Reider,[2] large doses of bitters also retard the emptying of the stomach (dog). This must be due to a direct depression of the gastric movements of digestion, or to a retardation of the digestion process itself.

The present series of experiments deal with the question whether these tonics are capable of influencing the secretion of gastric juice, and in that way act favorably on gastric digestion. The literature on this subject is both considerable and conflicting. It seems pretty well established that the bitters have no action on the pepsin-hydrochloric acid digestion itself, except possibly in way of slight retardation.[3] This slight retarding action is of no practical significance, especially when the bitters are taken twenty or thirty minutes before the meal, or even just before the meal, because of the great dilution with gastric juice, saliva and the fluids of the food. The literature also points to the conclusion that by themselves the bitter tonics are incapable of causing secretion of gastric juice either by acting in the mouth or in the stomach. Pawlow[4] noted in dogs that the bitters acting in the mouth cause a copious flow of saliva, but leave the gastric gland perfectly quiescent; and not even when introduced into the stomach do they cause secretion of gastric juice.

Some observers (Reichmann,[5] Scheffer[6] and others) have reported that as long as the bitters remain in the stomach they depress or diminish the secretion of gastric juice, and this led to giving the bitters from ten to thirty minutes before the meals.

Do the bitter tonics augment the secretion of gastric juice indirectly by increasing the excitability of the nerve endings of taste in the mouth, and possibly the nerves of appetite sense in the stomach? This is the view emphasized by Pawlow,[7] but he does not adduce any experiments in its support. The work of Borissow[8] seems to confirm it, however. Borissow reports twelve sham feeding tests on one dog with gastric fistula and esophagotomy. Six of these tests were made after giving the dog tincture of gentian in the mouth. In both series of tests the sham feeding was continued for one minute and the gastric juice collected for two hours following the sham meal. In the case of the gentian series the sham feeding was instituted as soon as the profuse salivation induced by the bitters had ceased. Borissow obtained the results recorded in Table 1.

TABLE 1.—SHAM FEEDING TESTS OF BORISSOW

Series	Minimum c.c.	Maximum c.c.	Average c.c.
Normal or no tonic	59.3	126.5	101
Tincture of gentian	85.1	185.2	130

There was no difference in the acidity and the pepsin concentration of the gastric juice of the two series, but the average excess of gastric juice in the gentian series is striking. However, it may be questioned whether a short series of tests on one animal can be held as conclusive, especially in view of the great individual variations (over 100 per cent.) within each series.

EXPERIMENTAL PROCEDURE ON MAN

It will be recalled that Mr. V.,[9] our man with permanent gastric fistula, has the esophagus completely constricted at the level of the upper end of the sternum, so that nothing can be swallowed from the mouth and reach the stomach via the esophagus. Above the constriction the esophagus is somewhat dilated so as to hold about half a glass of liquid. These conditions serve admirably for studying the influence of the bitters on the secretion of gastric juice.

On all test days 100 c.c. of water were put into the stomach 120 and sixty minutes before the meal, so as to insure a completely empty stomach. The tonics were introduced into the stomach via the fistula between fifteen and thirty minutes before the meal time. In the series of tests with the tonics in the mouth, these were put into the mouth and swallowed into the esophageal pouch ten minutes before the

* From the Hull Physiological Laboratory of the University of Chicago.

1. Carlson: Jour. Pharmacol. and Exper. Therap., 1914, vi, 209.
2. Heubner and Reider: Therap. Monatschr., 1909, xxiii, 310.
3. Wolf: Ztschr. f. klin. Med., 1889, xvi, 243.
4. Pawlow: The Work of the Digestive Glands, London, 1902, pp. 70, 138.
5. Reichmann: Ztschr. f. klin. Med., 1888, xiv, 177.
6. Scheffer: Jour. de méd. de Paris, 1910, xxii, 419.
7. Pawlow: The Work of the Digestive Glands, London, 1902.
8. Borissow: Arch. f. exper. Path. and Pharmacol., 1904, li, 363.
9. Carlson: Am. Jour. Physiol., 1912, xxxi, 151.

meal. They usually had to be expectorated before the meal actually began, because of the salivation induced by them.

In all three series of tests the gastric juice was collected during the first twenty minutes Mr. V. was chewing his food in the usual way preparatory to putting it into the stomach by means of a syringe. We are therefore dealing with the *appetite gastric secretion only*.

The stomach was invariably emptied just before Mr. V. started to eat, and record kept of the quantity, acidity and pepsin strength of this juice found in the empty stomach, as it was thought that the quantity and quality of this juice might serve to indicate the physiologic condition of the gastric glands, irrespective of the condition of the appetite.

The experiments were made during the months April to November, 1914. The tests with the tonics were interspersed with controls without the tonics all the way, so as to eliminate as far as possible the errors from variations in nutrition, appetite, etc., associated with variations in climate and in bodily activity.

It was aimed to make these tests a mere incident in Mr. V.'s daily routine. For that reason no special dietary standard was fixed. The ingredients of the noonday meal Mr. V. selected for himself at a nearby cafeteria. He naturally selected what appeared to him most palatable from day to day. The evening meal was taken in the same boarding house throughout the experimental period. Mr. V. states that the boarding house meals are very much the same from week to week, and less palatable than the noonday meal.

The tonics used (in therapeutic doses) were tinctures of gentian, quassia, calumba, humulus and condurango, and elixir of quinin, strychnin and iron. Most of the tests were made with the gentian tincture and with the elixir.

In order to exclude all possible psychic factors, Mr. V. was not told of the purpose of the experiments. He went about his daily work, taking his usual food at the usual time, while now and then a tonic was given and the appetitie secretion measured. I think it may be safely concluded that such psychic factors as faith in the potency of or hope of improvement from the drugs were entirely eliminated. Nor was the taking of any of these tonics by the mouth disagreeable or loathsome, so as to induce psychic depression.

RESULTS ON MAN

Fifty tests were made with bitters in the mouth and thirty-five with bitters in the stomach, with fifty-one control tests. These are summarized in Tables 2 and 3. The lunch and supper series are tabulated separately, because the appetite gastric secretion was uniformly less at the evening meal. This is probably due to less palatable food at the evening meal (absence of variety in the food, inferior cooking).

Examination of Tables 2 and 3 shows that the bitter tonics acting either in the stomach or in the mouth are practically without influence on the quantity of the appetite psychic secretion. There is a suggestion of an increased secretion with the bitters in the mouth for the noon meal series, but this is counterbalanced by a slightly lower figure for the evening meal. Table 3 indicates that the average physiologic condition of the gastric glands is practically the same in all the series.

As Mr. V. is a young man in good health, the question naturally arises whether the sensory nerves for the appetite sense (in mouth and stomach) are not normally in a state of maximum excitability, so that no further increase in excitability by bitter tonics is possible. This objection seems to be met by the lower secretion at the evening meal. Here is a condition in which *less palatable food should have been rendered more palatable by contrast with the bitter tonic*, or by actual increase in the excitability of the gustatory nerves. The results indicate no improvement by contrast. If the bitters in the mouth augmented the excitability of the taste nerves at the evening meal, this evidently caused an already unpalatable food to taste still more unpalatable, and hence the diminished appetite secretion.

These bitters in mouth or stomach produced no change in the acidity and in the pepsin concentration of the appetite gastric juice.

TABLE 2.—GASTRIC JUICE SECRETED BY MR. V. DURING THE FIRST TWENTY MINUTES OF CHEWING FOOD

Meal	Tonics	No. of Experiments	Gastric Juice in c.c. Lowest	Highest	Average
Lunch, 12-1 p. m.	No tonics	31	35	95	58.0
	Tonics in mouth	30	30	93	61.0
	Tonics in stomach	20	40	85	58.2
Supper, 6-7 p. m.	No tonics	20	20	50	36.0
	Tonics in mouth	20	20	48	33.0
	Tonics in stomach	15	18	47	30.1

TABLE 3.—GASTRIC JUICE IN EMPTY STOMACH OF MR. V. BEFORE EATING, IN THE EXPERIMENTS OF TABLE 1.

Meal	Normal, No Tonics	Tonics in Mouth	Tonics in Stomach
Lunch	18.3	18.4	19.2
Supper	16.6	15.0	17.2

EXPERIMENTAL PROCEDURE ON DOGS

The work was done on five dogs provided with an accessory stomach pouch according to the Heidenhain-Pawlow method. Care was taken to interfere as little as possible with the distribution of the vagi to the stomach pouch.

The tonics were introduced into the main stomach by means of a stomach-tube so as not to come in contact with the nerve endings in the mouth or esophagus. They were introduced into the stomach pouch directly with a pipet. When introduced into the mouth the bitters were soaked up in a small wad of cotton and the dog was compelled to chew on this for one minute. The tests were made twenty-four hours after the previous meal, and each dog was fed a fixed quantity of boiled lean meat. The gastric juice was collected for two hours after the beginning of the feeding.

The tonics were put into the main and accessory stomachs from twenty to thirty minutes before feeding, and into the mouth ten minutes before feeding. The size of the dogs varied from 5 to 8 kg. The quantity of tonics put into the stomach varied from 1.5 to 2 c.c.

The following bitters were used: tincture of gentian quassia and condurango and elixir of iron, quinin and strychnin.

RESULTS ON DOGS

Our results on the five dogs are summarized in Table 4. The data in this table permit only one conclusion, namely, that *these bitters acting in the mouth or in the stomach have no effect on the secretion of gastric juice in the dog*. The slight increase that

appears in the case of Dog 5 would probably have been counterbalanced if a larger series of tests had been made. The tonics did not produce any changes in the acidity and pepsin concentration.

TABLE 4.—RESULTS ON DOGS*

Dog	Tonics	No. of Experiments	Gastric Juice in c.c. Lowest	Highest	Average
Dog 1	No tonics	17	10	33	19.0
	Tonics in mouth	15	13	29	18.4
	Tonics in main stomach	15	10	26	18.6
Dog 2	No tonics	17	3	9	5.1
	Tonics in mouth	10	3	8	4.9
	Tonics in main stomach	10	2	7	4.8
Dog 3	No tonics	15	4	10	7.0
	Tonics in mouth	10	5	10	7.2
	Tonics in main stomach	10	3	8	6.8
Dog 4	No tonics	6	6	9	8.4
	Tonics in main stomach	6	5	11	8.0
Dog 5	No tonics	10	8	16	12.2
	Tonics in main stomach	9	7	17	14.0
	Tonics in small stomach	8	7	16	14.1

* Dogs with accessory stomachs prepared according to the Heidenhain-Pawlow method. Record of the secretion of gastric juice for the first two hours following a standard meal of lean meat. The variation in the average quantity of gastric juice secreted by the different dogs is due mainly to difference in size of the accessory stomachs.

COMMENT ON THE RESULTS

The possible value of these and other stomachics, especially in digestive disorders, might be investigated by other methods, such as the determination of the actual quantity of food consumed, the time required for completion of gastric digestion, etc., with and without the tonics. And the final verdict cannot be given until all possible tests have been applied. But as regards any favorable action of these stomachics on the gastric secretory mechanism in man and dog, our results go to show that it is nil, at least when all purely psychic factors are eliminated.

The use of bitters as medicine goes back so far that there is no authentic record of its beginning, and the number of different kinds of bitters advocated from time to time as useful is a large one. They are of so varied chemical composition that the only thing they have in common is the bitter taste. Of course, in this discussion, we do not include such substances as quinin or strychnin, or the bitters with alcohol as the main constituent, as these substances have distinct physiologic actions not directly related to appetite, after absorption into the blood.

The bitter tonics are still common "home remedies" and favorite "drug-counter prescriptions." They are often prescribed as a matter of routine and sometimes ordered because the physician actually believes they produce good results. Is this belief well founded? These tonics are given to convalescents who would continue to improve, tonic or no tonic, and the tonic, not the recuperative power of the patient, gets the credit. For many ailments the physician prescribes a more hygienic living and a tonic. The patient's health improves and both physician and patient think the tonic did it.

But even if the bitters have no direct action on gastric secretion and digestion, and no appreciable indirect action on the secretion of gastric juice, may they not be valuable aids in expelling worry and in implanting hope and good cheer in the mind of the patient? May they not be an efficient handmaid to psychotherapy? According to Cushny[10] that is their main, if not their only value. There is no question that the bitter tonics connect up with the popular belief that the potency of a medicine is directly related to its strong (or bad) taste. And the readiness with which these tonics are dispensed by the physician nourishes the popular superstition that there is, or must be, a specific drug remedy for every ailment, a superstition that constitutes the open sesame of the medical quack and the patent medicine vender.

The stimulation of certain nerve endings in the mouth and in the normal gastric mucosa unquestionably contributes to the complex sensation of appetite,[11] and these nerves are stimulated by condiments and flavors of food. Apart from this, the physiologic way of augmenting hunger and appetite is moderation in the food intake or increasing the utilization of the food in the body by work and cold.[12] If these measures do not improve appetite and hunger, the chances are that the digestive tract is not in a condition to take care of the amount of food demanded by the stronger hunger and appetite sensations.

To be sure, in therapeutic doses these tonics may be harmless, except in so far as their use contributes to the drug habit in emphasizing the "take something" instead of the "do something."

10. Cushny: Textbook of Pharmacology, 1910, p. 55.

11. Carlson and Braafladt: Am. Jour. Physiol., 1915, xxxvi.
12. Carlson: Am. Jour. Physiol., 1914, xxxiv, 155. Luckhardt and Carlson: Ibid., xxxvi, 37.

THE ETIOLOGY AND PATHOLOGY OF BONE AND JOINT TUBERCULOSIS *

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My first duty is the pleasant one of thanking you for your kindness in asking me to read this paper. I very much appreciate the honor you have shown me.

I have chosen "The Etiology and Pathology of Bone and Joint Tuberculosis" as the subject of my paper, because in Edinburgh we have lately been doing some work in this connection which may interest you.

It will aid later in understanding if I explain now that my remarks may be summarized under two headings: etiology and pathology.

ETIOLOGY

The essential etiologic factor is, of course, the lodgment of the tubercle bacillus; but this primary factor is intimately related with two secondary considerations which are of great importance; and these two considerations are: (1) the type of bacillus which causes the disease, and (2) the route by which the organism reaches the site of its development.

1. *The Type of Bacillus.*—It is universally agreed that by certain peculiarities various subclasses or species of tubercle bacilli may be recognized. There are the important divisions of the typus humanus and the typus bovinus, and pathologically the less important avian and piscine varieties.

From the point of view of pathology, and more especially from the clinical aspect, the human and bovine types of tubercle bacilli are those which more closely claim one's attention. Why should there be such anxiety to find out the relative part played by the human and bovine bacilli? The reason is obvious. The routes by which the bovine bacillus attacks the human

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body may be limited to a single one, namely, the alimentary tract. The alimentary tract is infected by the ingestion of bovine tubercle bacilli in milk; and therefore, after an attempt at a logical sequence, it is the question of milk infection which is at the bottom of all this seeking after knowledge with regard to the type of bacillus in bone and joint tuberculosis.

This paper would be incomplete if I did not touch on the methods by which it is possible to differentiate between human and bovine bacilli. There are five possible tests recognized.

A. The rapidity of growth on mediums. Tubercle bacilli may be grown on various mediums, and one of the most suitable is inspissated egg (Dorset's medium). If comparison cultures are made of human and bovine organisms, it will be found that at the end of a common period the human bacillus will have grown more luxuriantly and more profusely than the bovine. This, however, cannot be considered by any means an absolute test; there is a large border line on which the organism grows neither profusely nor scantily.

B. The second possible test is based on another peculiarity in growth. It has been found that glycerin exerts a depressing effect on the growth of the bovine bacillus while it tends to stimulate the development of the human bacillus. Accordingly a medium is made consisting of egg and glycerin, and on it the doubtful bacillus is grown.

A profuse growth means a human bacillus; the organism which grows scantily, perhaps not at all, is bovine. Once again, one must confess, the test is by no means an absolute one for the same reason as before—a group which is on the border line.

C. At one time it was thought that there were great possibilities in distinguishing between groups of tubercle bacilli by their morphologic characters. Long bacilli were considered to be human; the short, squat bacillus suggested the bovine organism.

For all practical purposes the test is useless. There is one morphologic characteristic, however, to which one must attach some degree of distinctive power. It is the characteristic of nodular staining. Certain bacilli when stained with a modification of Gram's stain (Much's method) show dark nodules which look like spores, and what one would say is, that bacilli showing nodules are almost certainly human, while all bacilli which do not show them are not necessarily bovine.

D. Theobald Smith introduced a test of which he has made considerable use in differentiating between the types. A medium is made consisting of bouillon and glycerin. The medium is of a known slight acidity, and on it a pellicle of the bacillary growth is encouraged. As the organism grows, certain changes become apparent in the acidity of the medium—the acidity may progressively increase, and this is taken to indicate that the growing bacillus is human in type. On the other hand, the acidity may diminish and the medium may actually become alkaline; such is supposed to be pathognomonic of the bovine bacillus.

E. The inoculation test. This test depends on the susceptibility of the bovine species to the infection with the bovine bacillus; it may be carried out on calves, but for economic reasons rabbits are more suitable.

A full-grown rabbit is infected intravenously or subcutaneously with a small known quantity of tubercle bacilli (0.01 mg. intravenously or 10 mg. subcutaneously). After the inoculation one of two things will happen: the rabbit may show no ill effects; its weight increases or remains constant and if it is killed, six months after the injection, the only evidence of tuberculosis will be found in the shape of a few epithelioid follicles in the lungs. The other possibility may be a very different one; the inoculation is followed by a rapid loss in weight, an increasing cachexia, and death within six weeks. Post-mortem examination shows a generalized and rapid tuberculosis. The first result is produced by a human bacillus, the second by a bovine.

By methods such as these which I have outlined, a series of cases has been examined. It has been found that a proportion amounting to 62 per cent. owe their origin to the bacillus of bovine tuberculosis. These cases have been drawn entirely from Edinburgh and its neighborhood and the results obtained give one very serious food for thought. They can mean only one thing—a milk infected to a highly dangerous degree. Since these investigations a thorough examination of the Edinburgh milk supply has been made by Dr. Miller and Dr. Mitchell. The former has found that 16 per cent. of the samples which he examined were infected with bovine tubercle bacilli. The latter has found an even higher degree of infection, namely, 20 per cent.

There is one remark I wish to make regarding the cases due to the human bacillus which amounted to 38 per cent. In every case an inquiry was instituted into the question of tuberculosis existing among the other members of the family.

It was found that in 71 per cent. of these cases there was a history of tuberculosis—usually pulmonary—existing or having existed in the family.

The practical lesson to be drawn from such a fact is the importance of isolating pulmonary tuberculosis.

2. *Routes of Infection.*—The next question to be considered is the route or routes by which the organisms reach the sites in which they later develop.

Bones and joints are rarely the situation of the primary development of tuberculosis; when they are attacked, it is secondary to some more distant infection, and the vehicle by which the infection is carried is the blood, or the lymph stream. Much controversy has been waged over the fact of whether the bone or the joint is the first to become infected, and I shall briefly tell you what experiment would appear to prove.

First and foremost, it is an undoubted fact that it is difficult and in many cases impossible to infect the cavity of a healthy bone with tubercle bacilli—the resistance of the marrow is too great, and the bacilli are almost invariably destroyed.

The second point is, that the joints are readily infected, and the infection is borne to them by the blood-stream. The anastomosis of the circus vasculosus in the fringes of the synovial membrane is more exactly the situation in which the disease begins.

Now clinically an osseous tuberculosis does occur and one naturally asks how one is to reconcile such an occurrence with the two statements just made. The explanation is as follows: While tubercle bacilli cannot develop in a healthy marrow, yet if the marrow is altered, the disease may arise therein. The change in the marrow is of the nature of a gelatinous degeneration—a disappearance of the true marrow-cells, and a proliferation of the fibromyxomatous groundwork.

In a marrow so altered tuberculous disease readily develops.

What causes this marrow change? It is partly the result of a vascular degeneration—an endarteritis and

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thickening of the vessel-wall with a resulting interference with nutrition—and partly the result of a tuberculous toxemia.

Two groups of vessels may be affected: the main nutrient vessel entering the center of the shaft, or the metaphyseal vessels passing into the bone near the epiphyseal cartilage.

The thickening of the vessels is the result of the tuberculous toxemia—the circulation of the tuberculous toxin. The thickening of the nutrient artery may be secondary to tubercle in various parts of the body; the thickening of the metaphyseal vessels is most usually the result of a focus of tuberculosis in the neighboring synovial membrane.

Therefore, what one knows experimentally regarding the etiology of tuberculosis of bones and joints may be summed up as follows: Synovial tuberculosis is readily produced, and the synovial membrane is infected by the blood-stream. Healthy bone cannot easily be infected with tuberculosis; its marrow must first undergo a gelatinous or fibromyxomatous degeneration, and such a degeneration is the result of a tuberculous toxemia and of a tuberculous endarteritis of the vessels supplying the bone, the nutrient vessels or the metaphyseal. In a bone, the marrow of which becomes so altered, tuberculous osteomyelitis develops.

PATHOLOGY

The first point to arise under the question of pathology is the exact situation of the bone in which the disease begins. I need not remind you of some of the anatomic facts: the epiphysis, the epiphyseal cartilage, the metaphysis and the diaphysis.

The disease may begin in the center of the diaphysis, as is seen, for example, in spina ventosa or tuberculous disease of the short and short long bones. On the other hand, the disease may begin at the articular ends, the metaphysis or in the epiphysis; and whether the epiphysis or the metaphysis is attacked depends on the situation of the reflection of the synovial membrane. If the reflection lies only in relation to the epiphysis, then the epiphysis is attacked, and, if it is in relation to the metaphysis, the metaphysis is the seat of the disease.

Changes Which Result from the Lodgment of the Bacilli

The probability is that the bacilli become originally deposited by an extravasation of the blood from one of the blood-vessels, the wall of which has been previously weakened by endarteritis. A slight sprain may be the trauma. In the effused blood the bacilli develop, and as in tuberculosis elsewhere the result of their growth is the formation of a small tuberculous follicle, perfect in every respect, with giant cells, epithelioid cells and lymphocytes. This is a point which it is important to emphasize. The primary lesion is a true follicle developing in the marrow.

As the follicle enlarges others appear around it, and, amalgamating, may form a mass of appreciable size—so large as to be apparent to the naked eye as a tiny white spot in the center of the marrow.

Coincident with the development of the follicle, changes appear in the center of the follicle and at its periphery. The central change is one of the caseation; the peripheral change is an attempt at fibrosis and localization of the follicle. If the central change is marked and the peripheral one inconsequent, the caseating disease extends rapidly throughout the marrow, and the type of disease known as "infiltrating tuberculosis" results.

If, on the other hand, the peripheral change is more evident, the disease remains localized, as an "encysted tuberculosis."

Independent of the growth of the tuberculous follicle, however, there are coincident changes apparent in the various constituents which comprise the bone, and it is from these changes that many of the clinical appearances gain their characteristic features. The structures which show changes are the bone-marrow, the bone lamellae, the periosteum and the blood-vessels.

1. *Marrow Changes.*—The changes in the marrow are twofold: an early or cellular, and a later or fibrous. The first is an actively antagonistic one, the second is more limiting in its intention.

Cellular changes: The grayness of the original follicle is always relieved by a setting of red, and such coloring is the evidence of the active changes in the marrow around.

Microscopically it is a neutrophil leukoblastic reaction, at first of immature cells, but later of fully developed polymorphonuclear neutrophils.

The cells are possessed of high phagocytic powers; they contain quantities of altered blood-pigment, and their action must frequently lead to destruction of the attacking bacilli.

This, which one may term the acute reactionary stage, lasts for about 120 hours from the date of the original infection. The character of the cells then begins to change, the polymorphonuclears diminish in number, and are replaced by two varieties of cells—a small lymphocyte and a type of immature lymphocyte or large mononuclear cell. The production of these cells is of course very suggestive of the development of tuberculosis. The connective-tissue cells remain constant, the fat cells appear to be diminished, but the diminution is more apparent than real. These changes in their sequence are most intense in the neighborhood of the diseased focus and they extend in a diminishing degree throughout the surrounding tissues. The cellular reaction of the marrow continues as long as the disease is increasing in extent, as long, in fact, as active phagocytosis is necessary. When the growth of the disease becomes arrested the cellular reaction disappears, and the marrow passes into the series of changes which end in fibrosis.

Fibrous Changes: The conversion of the marrow into fibrous tissue is a gradual process which extends over some considerable time. The change is inaugurated by a disappearance of the specialized cells (lymphocytes) with a corresponding increase in evidence of the fat cells, and the appearance among the latter of young connective tissue. This connective tissue develops from two sources: (*a*) from the connective-tissue corpuscles which lie scattered among the fat cells, and (*b*) from the connective-tissue fibrils which exist in the perivascular tissues.

The formation of connective tissue between the fat cells of the marrow gives rise to a curious mosaic-like appearance. The fat cells diminish in size and tend to atrophy, and sometimes the fat becomes broken up into an amorphous collection of analytic products. When the connective tissue is derived from a perivascular source, the vessel acquires a thickened appearance, but there is no endovascular change. The further history of the connective tissue is one of increasing density; the fibrillae tend to lie closer together and to become more compact. The degree of density is greatest in

the immediate neighborhood of the diseased focus. Fibrosed marrow is yellowish-white and of a remarkably firm consistency. These marrow changes are the result of specific demands. The primary infection is that of an irritant, and as such it calls forth a simple leukoblastic reaction. With the development of the lesion the specific action of the tuberculous tissue becomes evident, and the result is the production of cells specially antagonistic to tubercle, namely, the lymphocytes. When the antagonistic attitude is no longer demanded, the marrow undergoes a sclerosing change in order to limit and encapsulate the focus.

2. *Lamellar Changes.*—When tuberculosis develops in a bone, the surrounding lamellae undergo distinctive changes. These changes are of two possible varieties, rarefaction of the lamellae—osteoporosis—and thickening of the lamellae—osteosclerosis. In an individual lesion only one type of change may occur, but it is more usual to find the two types occurring together.

Osteoporosis: Rarefaction of the lamellae is brought about by true absorption of the bone, or by a variety of metamorphosis. Osteoclasts are the medium when absorption is the end in view. They appear beside the lamellae, and as a result of their action excavations appear which are known as Howship's lacunae. By continuation of the process large areas of bone are removed, and individual lamellae in process of removal acquire a typical worm-eaten appearance. This is the more rapid mode of rarefaction; it is best seen in those instances in which a considerable portion of bone must be quickly removed and replaced by a specialized fibrocellular marrow.

The metaplastic is the second method of rarefaction, and of the two it is the more common. A lamella is built up of a dense connective tissue, impregnated with lime salts. In the process of metaplasia the lime salts disappear and the fibrous elements remain. At first the position of the original lamella is evidenced by the unusual density of the fibrous tissue, but it quickly becomes imperceptibly merged in the surrounding tissues.

While one has drawn an absolute distinction between these two methods of rarefaction, it must be remembered that the two may and do occur synchronously in the same specimen.

Osteosclerosis: Osteoblasts derived from the connective tissue cells are the factors by which the lamellae increase in thickness. They arrange themselves along the surface of the latter, and deposit successive layers of dense new bone. This new bone possesses certain peculiarities which at once distinguish it from the old: it contains a greater number of bone corpuscles, it stains a lighter color, and the junction line between the old bone and the new is sharp and distinct, with an edge which is often irregular. The process of osteosclerosis is indicative of the more chronic types of bone disease; its objective is a limiting one, but a more passive limitation than that of fibrous marrow, for example.

3. *Periosteal Changes.*—It is recognized clinically that a subperiosteal thickening is one of the earliest features of tuberculous disease of the underlying bone. Such a subperiosteal thickening is the result of a deposit of periosteal bone, and the activity of the periosteum depends on an increased vascularity secondary to the underlying disease. The deposited bone is one of two kinds, porous bone or dense bone, and with each variety the method of formation differs.

Method of Formation of Porous Bone: In the deeper layers of the periosteum, in addition to numerous osteoblasts, there are always to be found a number of osteoclasts. The function of these is normally in abeyance, but by their activity they carry out a preliminary which is essential to the later stages of new periosteal bone formation. The osteoclasts eat out a series of lacunae along the shaft of the bone until the usually smooth surface becomes rough and irregular. Their activity is short-lived, and the completion of the surface excavation is the signal for the cessation of their labors. As soon as the osteoclasts cease their activities, the osteoblasts, which meantime have been proliferating in the deeper parts of the periosteum, suddenly begin to functionate, and a thin layer of new bone becomes deposited on the uneven surface of the irregular shaft. The introductory excavation of the osteoclast is quite an intelligible proceeding. If the periosteal bone had been deposited on a perfectly smooth and even shaft, it would have required only a slight degree of violence to dislodge its attachment, but the preliminary roughening of the surface is sufficient to prevent the possibility of this occurring.

After the first layer of bone is deposited, a second tier is begun. At certain points conical projections of new bone appear. They extend outward as small spines and in the interspinous intervals there is a quantity of granulation tissue and one or more blood vessels. The scheme of architecture undergoes further changes when the spines become joined at their extremities, and a series of arches is formed. Successive series of arches are in this way deposited until a varying thickness of porous bone has been laid down. It is a scheme of architecture in which nature combines a maximum of strength with a minimum of weight.

Method of Formation of Dense Bone: Occasionally the new periosteal bone is compact in character. The preliminaries are similar to those in the deposit of porous bone, but in the later stages no arches are formed, the bone remaining compact throughout. This is the method of deposit which one finds occurring in the neighborhood of joints, the reason being that the amount of its deposit is never excessive; the more profuse porous bone might easily interfere with the mobility of the joint.

4. *Changes in the Blood Vessels.*—One cannot fail to be struck by the frequent occurrence of endarteritis obliterans in bone tuberculosis. The disease affects the smaller vessels and occasionally the primary divisions of the nutrient vessel. In histologic detail the changes closely resemble those which occur in syphilis, but the changes in the tunica adventitia illustrate a distinctive feature. In syphilis the external coat is infiltrated and surrounded by a number of small lymphocyte cells; in the endarteritis of tuberculosis no such cells are to be found; instead there is a development of perivascular connective tissue. The condition arises from the corculation through the vessels of a tuberculous toxin. The change has far-reaching results; the narrowing of the vessel lumen gives rise to considerable disturbance in nutrition, and many of the fibroid changes in the marrow are sequelae to it. Further, the disease of the vessel wall has an effect on the local development of tuberculosis. Many of the cases of so-called primary tuberculous disease occurring in the metaphysis of the long bones, the short long bones, and the short bones owe their origin to an antecedent endarteritis of the larger blood vessels.

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The Gross Pathologic Varieties of Osseous Tuberculosis

The previous section has been devoted to what one might term the general pathologic changes, changes which in some degree at least are common to all forms of the tuberculous lesion. Each case of tuberculosis, however, possesses some peculiarity in its general features which justifies its classification under a special type of the disease. Therefore one may classify four different varieties: (1) the encysted tuberculous lesion; (2) the infiltrating tuberculous lesion; (3) the atrophic tuberculous lesion, and (4) the hypertrophic tuberculous lesion.

1. *The Encysted Tuberculous Lesion.*—When the disease focus, after enlarging to a certain extent, becomes shut off and localized, it is termed an encysted tuberculosis. The encysted tubercle is the commonest variety. It is also the most chronic, and its chronicity is evidenced in every step of its formation.

Macroscopic Appearances: The fully developed lesion varies considerably in size: A common gage is from a pea to a walnut. For descriptive purposes it may be considered in a series of zones. The center is occupied by an area of translucent jelly-like material, through which are scattered a number of opaque gray points, rather resembling putty in appearance. When the lesion is of some age the individual opaque spots amalgamate and form a central caseous patch, which is surrounded by a thin shell of the original jelly-like material. Passing to the periphery, there is a band of pinkish-white running round the translucent zone and sharply defined from it. The circumference of this zone merges imperceptibly with the surrounding marrow, which at the line of junction is somewhat more congested than usual. When the disease is of considerable age, the central portion becomes converted into a collection of semi-fluid débris, giving the part a cystic appearance.

Microscopic Appearances: The disease begins as a follicle of the loose reticular type. It enlarges until it can be appreciated by the naked eye as a gray opaque pin-point in a setting of red marrow. There is a ground work of branching connective-tissue cells, and the interspaces are filled with epithelioids and mononuclears: giant cells are usually present.

The impression afforded is one of a chronic and slowly developing tubercle. As the disease develops in the marrow, it comes to surround and enclose a number of bone lamellae, and the latter undergo rarefaction and absorption by means of osteoclasts, the slow development of the follicle usually affording sufficient time for the absorption to become complete. If the absorption of the lamellae should not be complete, the particles which are left, being isolated by the diseased tissue, undergo necrosis and become converted into small sequestra, commonly known under the term "bone sand." In the central clear deposit, areas of caseation appear, and they may coalesce into a patch of considerable size. Around the tuberculous tissue there is a limiting band of connective tissue. It is the pink, limiting band which has been noted in the macroscopic appearances, and it is developed from the connective tissue elements of the surrounding marrow. The changes in the surrounding marrow are not extensive; close to the disease the connective-tissue cells proliferate, and the marrow acquires a loose fibromyxomatous character.

One would summarize the sequence of events as follows: A deposit of reticulated tubercle appears in the center of the marrow, and it increases in amount, the bone lamellae being absorbed, until it forms an appreciable gelatinous-looking patch. Caseation appears in the center of the patch, and the lesion is localized by the formation around its periphery of a pale pink band of loose connective tissue.

2. *The Infiltrating Tuberculous Lesion.*—Nélaton described an infiltrating type of bone tuberculosis in 1836, and it was probably the first variety to be distinctly classified. It essentially represents the acute form of the disease.

Macroscopic Appearances: The naked-eye appearances are best appreciated in a lesion of some considerable size. As in the encysted disease, there is a natural division into a series of zones. The center is occupied by a pale-yellow area, yielding and crumbling when touched: it is the rarefied bone framework, the interstices being filled with caseous débris.

Nélaton described it accurately when he called it *l'infiltration puriforme*. Extending around the central patch there is a zone of gray semitransparent tissue (*l'infiltration grise*), which merges almost imperceptibly into both the central and peripheral tissues. The appearance is afforded by the infiltration between the lamellae of tuberculous granulation tissue which has not yet passed on to caseation. Around the gray zone the marrow is more congested than usual. It constitutes the third or red zone (*l'infiltration lie de vin*). At the line of junction of the gray and the red the latter is sometimes modified to form a paler pinkish band.

Microscopic Appearances: In its earliest stages the infiltration type of disease begins as a deposit in the marrow of a number of groups of epithelioid cells. These coalesce until an appreciable area is occupied by the diseased tissue. The naked-eye appearance is that of a gray, semitransparent tissue filling the interlamellar spaces. Its exact structure is difficult to elucidate. It is composed of densely packed masses of mononuclear and epithelioid cells. Intercellular connective tissue is at a minimum and here and there are branching connective-tissue corpuscles. There is an early arrest of the vascular supply, and to this change one must attach considerable importance; it hastens the process of caseation and in all probability it greatly depreciates any attempt at resistance in the surrounding tissues. Areas of caseation appear in the center of this semitransparent tissue, at first isolated but later coalescing, and it is this caseous change which gives the characteristic yellow appearance to the central part of the lesion. As the disease develops, numbers of the bone lamellae become surrounded. When this occurs an effort is made to remove each individual lamella by means of osteoclasts, and in this the process of rarefaction consists. In an infiltrating disease all active changes are arrested long before rarefaction becomes complete, the blood-flow ceases, perhaps the toxicity of the bacillus is great; at any rate the process of absorption is arrested, the lamella dies and constitutes a sequestrum. Scattered throughout the tuberculous tissue there may be numerous sequestra (*sequestres parcellaires*), each bearing evidence by its worm-eaten appearance of the degree of rarefaction which it has undergone.

If the infection has been specially rapid and acute, necrosis may occur before any degree of absorption has become possible, in which case a large lamellar area dies, and remains in contact with the surrounding bone,

until it becomes separated by granulation tissue. Such constitutes a composite sequestrum. In the surrounding marrow there is a leukocytic reaction around the periphery of the disease, and the type of cell which constitutes the reaction is mainly the polymorphonuclear, the representation of lymphocytes and mononuclears being sparse. There is, in fact, a cellular reaction resembling that which one finds in acute infections, and it has been suggested that a mixed infection is the dominating factor in the pathology of infiltrating tuberculosis. Occasionally, the cellular reaction becomes modified, and there is an attempt at fibrous limitation of the disease. This is the explanation of the pink band, which one occasionally finds at the periphery. The periosteum becomes early activated, and forms masses of new bone. The details of the method have already been described. The essential factor is a congestion of the overlying periosteum, secondary to the central disease; the deposit may be localized or it may extend widely over the shaft of the bone.

3. *The Atrophic Tuberculous Lesion.*—The distinctive feature of this variety of tubercle is a wasting and atrophy of the bone lamellae. In some respects, it resembles the caries sicca first described by Volkmann in 1879, and later by Koenig in 1896; but, on the other hand, it has characteristics which associate it with the caries carnosa of Koenig and the *tuberculose charneu* of Mauclaire. It is more correct to consider caries carnosa and caries sicca as the same type of disease in different stages of its development, and confusion is avoided if both terms are combined in the single descriptive title of atrophic tubercle. The reason for this will be more obvious when the lesion has been fully described.

Macroscopic Appearances: The situation of the disease is typical in so far as it attacks the metaphyseal end of a long bone. The affected bone is uniformly and diffusely enlarged. It is much lighter than healthy bone, and its surface yields to the application of a moderate degree of pressure with a curious crinkling sensation. The periosteum undergoes a moderate degree of activity, and a thin sheath of new periosteal bone is deposited. On cross-section of the bone, after the outer shell is divided, the interior is found to be occupied with a soft granulation tissue in which atrophied lamellae are scattered. The granulation tissue is of a flesh color, and throughout its substance there are numerous spaces, producing a spongy appearance. The changes may extend to the articular cartilage, but the latter is never invaded.

Microscopic Appearances—Changes in the Marrow: The earlier changes appear in the marrow, and in their development they are slow and insidious. Gradually the connective-tissue elements increase at the expense of the fatty tissue, and the marrow becomes transformed into a variety of granulation tissue. The granulation tissue is largely composed of connective-tissue cells of a myxomatous type, and the vascularity of the part is considerable. There are numbers of mononuclear cells and osteoclasts, and there is a tendency for the parts to become cystic. Scattered throughout the bone there are tuberculous follicles, but their numbers are few, and in structure they are, almost without exception, reticulated. As the disease progresses there is an ever-increasing tendency for the granulation tissue to become converted into fibrous tissue.

Changes in the Lamellae: With the replacement of the marrow by granulation tissue, the bone lamellae undergo a rapid absorption. It begins in the center of the shaft, and it is the result of the activity of osteoclasts. The absorption extends to the compact bone of the shaft, the lacunae are increased in size, and the whole appearance is one of extreme porosity.

Changes in the Periosteum: With the appearance of radical changes in the center of the bone, the periosteum acquires a sudden activity; the result is the deposit of a sheath of new subperiosteal bone of the vascular cancellous type. The further history of the periosteal bone is thoroughly distinctive of this type of lesion. When a considerable amount has been formed, the foundation from which it springs becomes undermined; that portion which lies in contact with the shaft becomes absorbed, and between the new bone and the original shaft there is a ring of granulation tissue. The periosteum goes on forming new bone peripherally, but the deeper portion continues to be removed, and this is maintained until there is a considerable thickness of granulation tissue separating the new periosteal bone from the original shaft. The result is an increased but very unstable circumference.

4. *The Hypertrophic Tuberculous Lesion.*—As there is a type of bone tubercle in which an atrophy of the lamellae is the distinguishing feature, so there is a form in which a thickening of the lamellae is the predominating factor. Its occurrence is rare, and its situation is typical so far as it attacks the metaphyseal end of a long bone.

Macroscopic Appearances: There is a diffuse thickening of the bone, beginning where the diaphysis joins the epiphyseal cartilage, and extending toward the center of the shaft. The periosteum is readily detached and, in the later stages, there is a deposit of new subperiosteal bone. The weight of the part is considerably increased. When the bone is divided in transverse section, its structure is found to be unusually dense and firm. From the healthy tissue, a hyperostosis can gradually be traced, and the hyperostosis is the result of an endosteal formation. The thickening is not uniform throughout the whole diameter. In the center, there is an area from which the lamellae have been absorbed, their place being taken by a quantity of gray semidiffluent material. Embedded in the center of the soft tissue, there is usually an elongated sclerosed sequestrum.

Microscopic Appearances: Changes in the Blood Vessels: These are given the premier consideration because they are undoubtedly the first changes to appear, and probably the vascular derangement is the essential etiologic factor in the peculiarities possessed by this type of the disease. The changes appear in the larger divisions of the nutrient vessels soon after the latter break up into their primary divisions, and they take the form of a structureless effusion around the vessel, and an endarteritis in the substance of its wall. The perivascular effusion does not remain structureless, it becomes organized and converted into granulation tissue. The endarteritis in the wall progresses, and the vascular and perivascular sclerosis soon leads to an almost complete obliteration of the vessel lumen. It is a periarteritis and an endarteritis.

Changes in the Lamellae: When the thickening of the central vessels has developed, the lamellae immediately surrounding the vessel undergo an absorption and a fibrous metaplasia. These changes depend on nutritional disturbances, resulting from the thickened blood-vessel. Where the lamellae have become absorbed, the resulting space is occupied by a fibro-

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myxomatous tissue. Outside the central area of absorption the lamellae become thickened, and the hyperostosis results from the deposit of bone by osteoblasts lining the lamellar surfaces. It is essentially an endosteal thickening, and the result is a remarkably firm dense bone.

Formation of Sequestrum: When an area in the interior of the bone has been absorbed and replaced by granulation tissue, a variety of sequestrum occurs about the center of the bone. It is the type of sequestrum Ollier called *le sequestre dur*. Its method of formation is as follows: A number of osteoblasts, assuming a sudden activity, deposit a quantity of closely arranged new bone in the center of the area from which the lamellae have been absorbed. This original deposit is not permanent. When it has reached a certain size, it becomes absorbed and is redeposited as a firmer, denser bone. This process of absorption and remodeling is repeated until the deposit is densely sclerosed. Up to this point of development, the term sequestrum is a misnomer, the tissue is not dead. Later it becomes a true sequestrum from the interference with its blood-supply. These are the appearances which one finds on cutting through the center of the diseased bone: an outer zone of hyperostosis, an elongated central sclerosed sequestrum, and an intermediate area of soft granulation tissue.

Changes in the marrow: Mention has been made of the formation of fibromyxomatous tissue in the center of the bone. Generally the marrow undergoes a fibrous degeneration. True histologic evidence of tubercle occurs in the shape of a number of follicles developing in the granulation tissue in the center of the bone.

Changes in the Periosteum: In the early stages of the disease, the periosteum shows no reaction, and the thickening is entirely endosteal in its origin. In later stages, the periosteum is activated, and deposits a thin layer of new bone around the sclerosed shaft.

ABSTRACT OF DISCUSSION

DR. LEONARD W. ELY, San Francisco: I am confronted by a tragedy! The theory, or the inference, which I have nursed so carefully for the past three or four years is in danger of sudden demise. We have all watched Mr. Fraser's remarkable work on bone and joint tuberculosis; and while some of us have not, in the past, been able to agree with him in his conclusions, I think that the evidence which he presents is staggering. He has done most careful work. His methods have probably never been approached in thoroughness; and our first impulse, when hearing his views, is, as it always is when we hear something new, to say, "Why, that cannot be so; because that does not agree with my experience." Well, if careful and scientific work does not agree with our experience, so much the worse, not for the careful work, but for our experience. These things are not to be decided forensically, with "hot air," but by hard work in the laboratory; and while I am not yet ready to accept absolute defeat, I may still say that my opinions, my conclusions, have been very decidedly shaken. It comes back to the bald statement, again, that we really do not know enough about bones and joints. We have not known enough heretofore to reach conclusions that we could depend on. We look at our slides under the microscope and see certain things; and we deduce elaborate theories from them. Another man, however, looks at our slides and deduces other very elaborate theories. Bone-marrow, when all is said and done, is almost a *terra incognita*. I hesitate to say much about this bone-marrow work now. I have always believed, of course, that the red bone-marrow was absolutely essential to the occurrence of bone tuberculosis, but in the face of Mr. Fraser's remarkable work, I would rather wait until I have some more "goods," so to speak, to deliver, before I say anything positive in that line. The battle is on and I shall try to do what I can to maintain my position.

DR. ALBERT H. FREIBERG, Cincinnati: I greatly admire the thoroughly scientific manner in which Mr. Fraser has proceeded with his work, and the apparently convincing facts that he has brought forward. I think that, perhaps, out of all this will come something that will be of extreme practical importance. We study the pathology of tuberculosis of the bones and joints in the living, in practice to-day, by means of the Roentgen ray; and it seems to me that we can read, in our roentgenograms, much that will be of value to us, resulting from what Mr. Fraser has shown. We have received emphasis on one fact concerning which, perhaps, Mr. Fraser will bear me out. I have been accustomed to lay great stress in the past on the fact that in the roentgenogram of tuberculosis of bones and joints, unless the cases have been in existence for a long time so that the process of repair has proceeded to a considerable extent, we practically never see new bone-formation on the surface. The process is rather one of destruction and wasting. The fact that new bone-formation is seen early in a disease I have always considered as evidence that the disease is not tuberculosis or is not uncomplicated tuberculosis. The fact that tuberculosis and syphilis can coexist, we have been accustomed to recognize for some time. I shall be much interested to hear Mr. Fraser's views on this practical point.

DR. FRED H. ALBEE, New York: Confusion may arise in the microscopic study of sections in cases in which syphilis and tuberculosis exist together, or when there is a question of the differential diagnosis between tuberculosis and syphilis. It is hard to tell, microscopically, a syphilitic lesion from a tuberculous lesion, and, at times, I believe, is impossible. Dr. Freiberg has suggested an important point, that when there is bone production, one should be guarded in saying that it is a purely tuberculous bone-lesion.

DR. ARTHUR STEINDLER, Des Moines, Ia.: In 1900 or 1902 Dr. Friedländer, in a monograph on the subject, established three distinct forms of diaphyseal tuberculosis. His investigation was a protest against the theory of the exclusively epiphyseal origin of bone tuberculosis then in vogue; in studies on this subject which we carried on later but did not conclude, we tried, in the first place, to secure earlier diagnosis of diaphyseal tuberculosis in the roentgenogram, and secondly, for early operation in order to reach tuberculous foci in ample time before penetration in the joint. Friedländer's first type was the solitary metaphyseal focus identical with the epiphyseal focus on the other side of the epiphyseal line; the second, the infiltrating form from the medullary cavity through the entire thickness of the bone; the third, the periosteal form, which showed in the roentgenogram several concentric layers of periosteal bone separated by layers of granulation tissue. This classification we used in making subdiagnoses of diaphyseal tuberculosis. In many cases solitary foci could be diagnosed and reached before penetration into the epiphyseal line.

DR. J. D. GRIFFITH, Kansas City, Mo.: If there is a chance of eliminating the bovine form of tuberculosis from our list of infections and getting rid of it, we shall add immensely to the longevity of our fellow-men. How does Mr. Fraser account for tuberculous infection in man without any seeming interference with the return circulation? If I understood him correctly, in his experience, he has only obtained infec-infection after interfering with the return circulation.

MR. JOHN FRASER, Edinburgh, Scotland: Answering Dr. Freiberg's question concerning the value of the Roentgen ray in diagnosing pathologic changes in the bones and joints, I believe that, on roentgenoscopy, one is almost certain to find the details of the pathologic changes that we find microscopically and macroscopically. We can actually see, in a roentgenogram, an endarteritis of the blood-vessel. It shows distinctly in illuminated plates, and I think that we can see the pathologic changes occurring. In this way one is frequently guided to the correct diagnosis. Dr. Albee spoke of the difficulty of differentiating between tuberculosis and

syphilis. I have shown in every case, on making an injection of tuberculous material into an animal, that the animal never failed to develop tuberculosis. Among those cases which I call the hypertrophic, we found cases of inflammatory reaction, as well as the development of tubercle; and we believe that these are cases of mixed infection. Dr. Fassett spoke concerning the rarity of the occurrence of tuberculosis in the shaft, as a frequent occurrence in the epiphysis; and he mentioned the work of Dr. Noyes of Edinburgh, who thinks that it is entirely metaphyseal or epiphyseal. He does not believe that it occurs in the shaft. Yet it certainly does occur in the shaft. He does not say, however, that it is rare in the epiphysis. That is the most common situation by far. He agrees that it occurs there. Dr. Steindler spoke of the work of Friedländer on diaphyseal tubercle, and his classification, including a purely periosteal form. If you search you will find in every case a central focus. Tubercle cannot occur primarily in the periosteum. It used to be thought that it occurred in the periosteum of the rib, but osteomyelitis occurs in every such rib. Dr. Griffith spoke of the importance of eliminating bovine tuberculosis. That is the most important part of the work. If we can eliminate that we shall have accomplished a great deal. Our system of milk inspection in Edinburgh, at present, is shocking beyond words; but we hope to have this corrected. Dr. Griffith also asked how I could explain the way in which, by retarding the blood-stream, we can localize tubercle, and asked how I could account for tuberculous infection without any interference with the return circulation. I would ask him how he knows that retardation of the blood-stream does not occur in such cases. The tubercle is always secondary to some focus in the body; and with this primary focus you get a thickening of the vessels, which produces a certain amount of retardation of the blood-stream over the entire body.

RECURRENT SPONDYLOLISTHESIS, WITH PARALYSIS; BONE-SPLINT TRANSPLANTATION *

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The fifth lumbar vertebra is subject to many abnormalities of development which may cause mechanical trouble. The most frequent anomaly is probably in the shape or size of the transverse processes. This will not be considered here.

Next in frequency is a variation in the articular processes, which may vary in size, in shape, or in direction. If the articulation be of the lumbar type, with the long axis of the joint antero-posterior, and the flat facets facing to the side, it is possible for the vertebra to slide forward on the sacrum when the spine is straight or extended, especially if the articular processes be small and the ligaments weak. If the processes be of the dorsal type, and this is by no means rare, flexion of the spine, with violence, may cause the facets to override; more easily, again, if these facets be small and the ligaments be weak.

The exhaustive work of Goldthwait[1] explained clearly the mechanism of this class of lesions, but no case of displacement of the fifth lumbar vertebra with paralysis has come under my observation until last year.

CASE REPORT

History.—In the latter part of February, 1913, a strong and healthy girl of 15 was carrying another girl in her arms, in the gymnasium, when she suddenly felt a pain in her back and fell to the floor in a faint. When she awoke there was a severe pain in the lower part of her back, but after a time, with some assistance, she was able to walk home. For a week the pain continued, though less severe, and she was able to go to school, but on the eighth day her legs grew weak and began to feel numb. A week later she was unable to walk at all. The pain radiated down the back of the thighs and legs, and for a time the family physician thought it might be due to "sciatic rheumatism." As it did not respond to salicylates, a neurologist was called in consultation.

The knee-jerks were increased, a slight ankle-clonus was present, and the condition was one of spastic paraplegia. It was thought that possibly a vertebral tuberculosis might be present, with pressure on the cord. A double Buck's extension was applied to relieve the painful flexion of the knees. In a few days the paralysis had disappeared, and the child was sent to the orthopedic department of the Chicago Policlinic to have an artificial ankylosis of the vertebrae made by the Albee method.

Examination.—On examination, however, no evidence of spinal tuberculosis could be found, and it seemed probable that the condition was due to a mechanical cause rather than to disease. An actual forward displacement of the fifth lumbar was not considered as likely as a protrusion of the intervertebral disk, although no history of a sideways bending at the time of the accident could be elicited.

Subsequent Course.—The patient was now apparently perfectly well, and after a week of observation in the hospital she was allowed to go home, in the belief that the trouble would not recur without severe exertion. She was cautioned to avoid lifting any weights and to keep quiet for some weeks. For a week at home she remained well, but the next day she stumbled over some obstacle on the floor and the paralysis recurred. The Buck's extension once more rapidly relieved the paralysis and a plaster jacket was applied, fitting very low over the hips. A few days later an attack of ptomain poisoning occurred, and the jacket was removed by the family physician on account of the distention of the abdomen. Now began a series of attacks of paralysis, averaging one every ten days, until January, 1914, when the child was confined to the bed all of the time. A small and inefficient commercial brace had been applied some time before, but it did no good.

I saw her again Feb. 6, 1914, ten months after she had passed from my observation. No paralysis existed, and the reflexes were normal. On bending her backward in bed, exaggerating the lumbar lordosis, the spinous process of the fifth lumbar vertebra could be felt to move forward abnormally far on the sacrum. This caused pain in the back and a tingling and pricking sensation in the feet. On bending the body forward, obliterating the lumbar lordosis, immediate relief was felt and the child stated that this occurred habitually on similar movements. She lies and sleeps with the spine in flexion for the sake of comfort.

Treatment.—An opinion was now given that the trouble was due to the slipping forward of the fifth vertebra as a whole, and that the best way to rectify it would be to implant a bone splint by Albee's method so as to immobilize the lower lumbar spine. Accordingly, on March 11, 1914, this operation was performed at the Policlinic. A splint was cut from the left tibia, curved slightly to fit the lumbar lordosis and the sacrum, and long enough to reach from the third lumbar process to the third sacral. The lumbar and first two sacral spinous processes were readily split, but the third sacral was merely a small projection, so a groove was cut out bodily in this region. The splint was sewed in with No. 12 braided silk sutures, boiled in mercuric chlorid solution and then in paraffin. These sutures were inserted deeply and strongly, with large needles and a heavy needle-holder, and they were tied very tightly. A layer of the lumbo-sacral fascia was sewed over the whole splint, covering both splint and silk sutures.

The girl was placed in an ordinary bed and kept recumbent for three weeks, when against orders she began to sit up when the nurse was out of the room. April 7 she went home, and April 21 began to walk about. Her back

* Read before the Section on Orthopedic Surgery at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

1. Goldthwait, J.: Boston Med. and Surg. Jour., 1911, clxiv, 365.

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felt perfectly well and strong and she remained in excellent condition until June 4, a period of over six weeks. On this latter date something gave way in her back, causing severe pain but no paralysis. Examination June 11 showed that the upper tip of the splint had become loosened from the third lumbar spinous process. The knee-jerks were normal, there was no ankle clonus and sensation and motion were undisturbed. There was easily perceptible grating and crepitus at the tip of the splint when the back was moved, and the pain was said to be quite severe on such motion. She was advised to keep perfectly quiet for a few weeks, in the hope that union might again take place, but it will probably be necessary to reattach the end of the splint by operation, or to cut the end off to relieve the discomfort. The lumbo-sacral joint remains perfectly fixed and there will apparently be no further trouble from this source.

NOTE.—Aug. 7, 1914. This patient was reoperated on July 1, 1914, and the upper end of the splint firmly reattached by drilling both splint and third lumbar spinous process and tying with silk. She is now sitting up in a plaster jacket without any symptoms referable to the original difficulty. The spine seems strong and the splint is apparently firmly fixed.

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ABSTRACT OF DISCUSSION

DR. FRED H. ALBEE, New York City: There has been considerable uncertainty about the result of the application of bone splints in the lumbosacral region. In my experience, the result has been as satisfactory when the graft has been placed in the posterior part of the sacrum as in other regions of the spine. Although the spinous processes there are small, as Dr. Ryerson has said, we are able by means of them, together with the splitting of the periosteum on the posterior part of the body of the sacrum and the scarifying of the bone, to get good union and a good surface for the application of grafts. I have had no trouble in getting union of the grafts in this region. So far as fixation of the fifth lumbar vertebra goes, the contrast of the results of this graft fixation with that of external fixation by means of braces or plaster jackets, is very gratifying. In fact, it is difficult to fix this region by any external means.

DR. CHARLES A. PARKER, Chicago: One point is of practical anatomic interest in cases in which the operation might not be successful. Fortunately, in the cases reported, it was apparently very successful. This is with regard to the development of the lower half of the fifth lumbar vertebra. The gentlemen who have described that development have gone into the matter thoroughly. The portion of the arch containing the spinous process frequently develops from an entirely different center from that of the upper half, and remains separated, except for cartilage, throughout life; so in the cadaver, the big body with the shortened arch is in one piece, and the lower half, with the lower articular surfaces, in an entirely separate piece. That is the usual variation found. It is united more or less firmly. Another variation is that the two halves of the spinous process may be quite separate. One can conceive that, in a case of that kind, when the graft was implanted into the spinous process of the fifth lumbar vertebra, there would be little control of the vertebra.

DR. J. TORRANCE RUGH, Philadelphia: I want to attest the value of the bone graft in this region. In a series of twenty-six cases I have had three in which the graft has been attached to the upper two sacral vertebrae, and the results have been as good as in any of the other sections of the spine. In one of my cases, after a period of six months, when the fixation was firm and the results all that could be desired, the patient on sitting down felt something give way. Examination showed a fracture of the graft between the fourth and fifth lumbar spines. She was placed in a solid plaster jacket and kept in the supine position for nine weeks, when firm union of the graft took place, just the same as it would have taken place in the shaft of any bone. At a subsequent operation, done for the purpose of attempting to reinforce this graft opposite the point of fracture, another graft was inserted; but, through a surgical error on my part, the flap of skin became devitalized, so that the graft was exposed and ultimately came out. As this was the thirteenth operation, it naturally would be expected to fail. That was the only graft that I lost in the twenty-six cases; and I think, from the experience I have had, that the attaching of the graft to the sacral region gives as good results as in any other region. Dr. Ryerson's paper is of immense importance, as opening up a field for the treatment of that most troublesome of cases, the cases of spondylolisthesis. In older patients, past 35 or 40, when it is possible by posture or some other method to eliminate the exaggerated lordosis and replace the cast, we shall have, I think, entire control of cases which hitherto have been extremely troublesome.

DR. J. A. NUTTER, Montreal, Canada: How does Dr. Ryerson explain paraplegia from so low a lesion as slipping of the fifth lumbar vertebra? I recently had occasion to examine post mortem a man with a broken back, at the Montreal General Hospital, and found a marked traumatic spondylolisthesis, probably hastened by congenital malformation of the laminae; without, however, any narrowing of the vertebral canal at that level. This man's paralysis was probably due to a coincident injury to one of the intervertebral disks, three or four vertebrae up, causing pressure on the cauda equina. We could not, at that time, attribute any of his paralysis to the fracture of the fifth lumbar vertebra. There was no narrowing of the vertebral canal at that level, in spite of the spondylolisthesis. I should like to have some light on that subject. How can injury to the cauda equina at the level of the fifth lumbar vertebra cause paraplegia?

DR. E. W. RYERSON, Chicago: It is quite true that it is not easy to constrict the spinal canal at the level of the fifth lumbar vertebra, but it can be done; and I can think of no other method by which this little girl's paraplegia could have been caused. I could put my finger on the fifth lumbar spinous process, and pinch it, and could then bend her backward and feel it slip so far that I am afraid to tell you just how far I felt it slip. It certainly could constrict any spinal canal that I have ever seen, and I do not think that any intervertebral disk higher up had anything to do with it. She was a sensible little girl and could locate it so accurately that, although I was at first doubtful of the cause, I had to be convinced. With regard to the attachment of the splint to the sacrum, the remarks made are pertinent; but when attachment is made there, it is not mechanically at as great advantage as when it is made to the spinous process. The immobilization must be carried out for a longer time than I carried it out in this case. I should have insisted on a longer period of immobilization. I believe that we must make every effort to prevent strains on the spine. There is a terrific leverage at the third and fourth lumbar vertebrae, and it takes a strong splint to make enough bone to gain security. As time goes on, we may make an attempt to produce ankylosis of the articular facets, rather than put in a bone splint in this locality.

Results of Infant Welfare Campaign.—During 1914 infant welfare work was carried on in twelve localities in New York. During the summer there were thirty-two different localities where such work was in operation. A comparison of the vital statistics of the two summers indicates the saving of many lives. During the four summer months of 1913 there were 4,387 deaths of infants under 1 year of age outside of New York City, while for the corresponding months of 1914 the infant deaths numbered 3,833, or an actual reduction of 554. The infant mortality, based on the ratio of deaths under 1 year of age to 1,000 living births, in 1913 was 141 for the summer months, June, July, August and September, while for the same period of 1914 it was 117. The State Bulletin of Health which presents these figures, states that two factors might influence these statistics, the better registration of births and the mild summer, but a comparison with the statistics of New York City show that these are not responsible to any extent for the great drop in infant mortality. The figures show that the infant death-rate in the city dropped twelve points in 1914 below the record of 1913, while the rate for the rest of the state dropped 23 points.

THE CAUSES OF SCOLIOSIS AND THEIR RELATION TO TREATMENT *

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No one biased in his belief should attempt the study of either the causes or treatment of scoliosis. We must approach the subject with an open mind. Each case is a problem in itself.

The treatment of structural lateral curvature is now advancing apace with our knowledge of other medical and surgical problems. This has been made possible by the investigations of Drs. Bradford, Lovett, Feiss and Forbes, and of late the study of the subject has been stimulated anew by the announcement of Dr. Abbott of Portland. Drs. Bradford and Lovett[1] studied the motions of the normal human spine in its various positions. They found there was no side-bending without rotation and no rotation without side-bending. They also found these motions were more free in flexion.

Lovett[2] experimented with the column of bodies and disks without their posterior segments and found it obeyed the laws of physics for flexible columns.

Feiss studied the complex problems of rotation and lateral bending, both by experiments on the living and by a mechanical model of the thorax and a model of a vertebra with its attached ribs.

Dr. A. McKenzie Forbes, of Montreal, impressed by the failures of all methods to procure the so-called forcible correction with plaster jackets, undertook a further study of the subject to explain and rectify the knowledge.

He has discovered a paradox, which is this: Given a case with right dorsal rotation, the only way to reduce this rotation is to rotate the body trunk to the right. His discovery was made by observations of a scoliotic subject with radiograms, and an exhaustive study of the work of Lovett and Feiss. This rotation is in exactly the opposite direction to that practiced by Abbott and all previous operators in attempting correction. In brief, Forbes puts his patients in a position of extreme flexion and rotation. They are then held in this position by plaster jackets with large windows.

In structural lateral curvature, we are dealing with a condition, not a disease. There are many causes of scoliosis, but they are not so multitudinous and are, in general, of a very different character from what an inspection of the literature would lead one to suppose. Bad seating at school, faulty postures, malleability of the vertebrae, osteomalacia, rachitis, infantile paralysis, empyema, numerical variations, extra and fused ribs, lateral half of a centrum missing, fused vertebrae, etc. —all have a bearing on the subject, some, but not all of them are true causes. In short, have not, many times, the contributing factors been mistaken for the true cause?

When one remembers the small seats in school for the rapidly growing child, the difficulty of getting one's knees under the desk, the curled up and side-twisted position in which we were taught to write, and yet no scoliosis developed, has not in this case the contributing factor been mistaken for the cause? We all sat curled up and sidewise when in school and while growing rapidly, yet no scoliosis developed.

Rachitis, osteomalacia and other bone softenings go into the same list. We have all seen profound rachitis without scoliosis.

Short leg, from whatever cause, and many other so-called causes are subject to the same criticism. Scoliosis occurs in some cases in which they exist, but if they are the cause, why does it not occur in all? The answer is, they may be a contributing factor, but they are not the cause.

Some years ago, Dr. Böhm[3] beautifully elaborated the theory of numerical variation, advanced by Rosenberg, to account for some of the anomalies which occur in the spine and its appendages. Possibly he has since expanded this theoretical garment to envelop spina bifida and all the rest of Nature's defects in the human frame.

Dr. Böhm stated in his paper that asymmetric sacralization might cause a lateral tilting of the top of the sacralizing vertebra and thus cause scoliosis. An inviting supposition, but it does not prove to be the cause in many cases of scoliosis.

Roentgenograms of the scoliotics at the Children's Hospital showed but few in which there was asymmetrical sacralization, and in these few, the top of the sacralizing vertebra was not tipped. At the Massachusetts General Hospital, in taking roentgenograms of subjects with indefinite pains in the back, or when renal or ureteral stone, etc., is suspected, asymmetrical sacralization in all degrees is often found but there is no scoliosis. If ever a cause it is a rare cause.

The Dwight Collection of spines in the Warren Museum further bears this out. Of the nineteen spines showing asymmetric sacralization but one has scoliosis, and that one also shows an absence of the right neural process of the first sacral segment, which is of far greater importance, so far as the cause of the scoliosis is concerned. But Dr. Böhm aroused interest in the anomalies of the spine and the effects they might produce, and for this deserves great credit.

Some three years ago in checking up the work of Dr. Böhm the conclusion was reached that so far as the cause of scoliosis is concerned, congenital defects of the articular processes were of far greater importance than asymmetric sacralization.

The weight of the trunk and upper extremities is largely borne by the flexible column of the vertebral bodies and disks, but it is also supported in a varying degree by the two more rigid posterior columns of the articular processes. Thus the support is tripedal.

With this in mind, we can all see how a missing half of a centrum, a wedge-shaped centrum, whether congenital or pathologic, or an extra osseous center on one side between the bodies, will cause lateral deviation and rotation, hence lateral curvature.

Such cases are rare; however, they form a class which show certain characteristics of their own, especially when they occur in the upper dorsal and cervical regions. The deformity usually appears early in life. They originate from defects in the embryo about the sixth week.

* Read before the Section on Orthopedic Surgery at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

1. Bradford and Lovett: Orthopedic Surgery, Philadelphia, William Wood & Co., 1911.
2. Lovett, Robert W.: Lateral Curvature of the Spine and Round Shoulders, 1912.
3. Böhm, Max: A Contribution to the Etiology of Lateral Curvature of the Spine, Boston Med. and Surg. Jour., Jan. 25, 1905; The Cause of So-Called Habitual Curvature of the Spine, ibid., Nov. 22, 1906

Anomalies of the sacrum, involving its neural arch or articular processes are very common. Dr. Goldthwait has already drawn the attention of orthopedic surgeons to these facts and has shown their relation to back strain.

Obstetricians realize the variations in inclination of the female pelvis, and the varying degrees of prominence of the fifth lumbar body, and Dr. Lloyd Brown has made clear the importance of these facts in the production of back strain and ptosis. In the female the average sacrovertebral angle is considerably (13 degrees) greater than in the male.

The late Professor Thomas Dwight once said, "Anomalies of the fifth lumbar vertebra are so common that we hardly know what the normal should be." This is equally true of the sacrum.

Sir William Turner, the famous English anatomist, found separation of one or both of the inferior articular processes of the fifth lumbar vertebra in 5 per cent. of all subjects. The pedicles of this vertebra occasionally fail to unite with the body; spina bifida is frequent in the lumbosacral spine.

Now realizing that the base on which the column of bodies and disks rests—namely, the facet on the upper surface of the sacrum—is not directed upward, but is distinctly inclined forward as well as upward, having a pitch of 40 degrees from the horizontal in the average female, and that this pitch varies in individuals, being often much greater than 40 degrees in women, and that the only bony obstacles to the forward coasting of the fifth lumbar body on this steeply inclined surface are the articular processes in which anomalies are so frequent, one or both being separate ossicles in 5 per cent. of all persons, is it remarkable that under such conditions, the fifth lumbar body should slip forward and hence downward on this incline? At 45 degrees of inclination a movement of one-fourth of an inch forward gives one-fourth of an inch drop.

The structures preventing this forward slipping are ligamentous, with the exception of the inferior articular processes of the fifth lumbar, above mentioned, which articulate with or hook on to the superior articular processes of the sacrum. With increase of the vertebrosacral angle comes increase of this tendency to slide forward, hence an increased strain, vertical as well as horizontal, on these four small processes. As the inclination increases, the horizontal thrust becomes greater and more vertical, that is, the two forces tend to a pure downward strain on the processes; thus in the standing position a large part of the weight is thrown on them.

The ligamentous structures which support this joint are the fibers of the intervertebral disk, which normally allows a certain excursion; the anterior common ligament which here is thin and broad; the posterior common ligament which is narrow at this level; the ileolumbar ligaments running from the transverse processes of the fourth and fifth vertebra to the crests of the ilia; the lumbosacral ligaments running from the lower edge of the transverse processes of the fifth lumbar vertebra to the top of the sacrum; the subflavous ligaments binding the lower edge of the lamina to the top edge of the sacral lamina; the interspinous and supraspinous ligaments and the articular, capsular ligaments about the articular joints. All these ligamentous structures, like other ligamentous structures of the body, are capable of being slowly stretched.

As a hypothesis let us take a patient in which one of these four articular processes is imperfect, or is detached from the centrum, or let one pair be so turned that they face outward and inward, while their fellows of the opposite side face backward and forward, or one pedicle may have failed to unite with the centrum. Under any one of these conditions, the whole support on one side would be ligamentous, while bony and ligamentous support is on the other side. The body of the fifth lumbar vertebra would sag forward and downward on one side, while it is held back on the other, hence, lateral rocking occurs with rotation of the base on which a compound mast, the spine, stands.

There will be a spondylolisthesis of one side. One side of the fifth lumbar body will swing forward about the articular process of the other side as a pivot, and due to the inclined upper surface of the sacrum will drop downward. The result of rotary motion of these two surfaces is well illustrated by a round stick sawed across at 40 degrees of inclination and the cut surfaces slightly rotated on one another.

Now suppose that the bony mass of one of these articular processes is increased in bulk, just as the transverse process of one side is increased in asymmetric sacralization. The vertebra will be pushed up by one leg of its tripedal support. We get forward and lateral tilting combined. Or if there is absence or marked undergrowth of one process, we get a backward and lateral dropping. Either is equivalent to combined side-bending and rotation, hence scoliosis. It is analogous to a camera on a level floor with one short or long leg to its tripod.

As the contributing causes, short leg, bad postures and seating, etc., have all been mistaken for the true cause. So have coexisting anomalies such as asymmetric sacralization and fused and extra ribs been mistaken for the true causes. All who have studied many roentgenograms realize the frequency with which multiple anomalies are found. In fact, it is usual to find several anomalies of varying degrees in one individual, hence the multiplicity of congenital causes recorded for scoliosis.

Anomalies of the spine may occur at any point, but they are more frequently found where a freely movable region joins one in which motion is less free, as the dorsal with the lumbar, or the lumbar with the sacral. As shown above, the joints of greatest consequence, so far as the site of the cause of scoliosis is concerned, are those in which the surfaces between the centra have a sharp downward inclination, the lumbosacral and those between the sacral segments. The sacral segments do not begin to fuse until the seventh or eighth year, and this fusion between the first two segments is often delayed. The articular processes between the sacral segments are always small and often very irregular, hence the first sacral segment may rotate on the second. This is especially found in cases in which the first sacral segment is anomalous. In rare cases it occurs between the second and third segments. The presence of an anomaly at the base of the spine even in scoliotics, does not prove that anomaly to be the cause of the scoliosis. Each case must be studied carefully, as regards the mechanical principles involved.

As the degree of forward slipping or drop depends not only on the character and magnitude of the lesion, but also on the inclination of the sacrum and extent of the consequent dorsal and lumbar anteroposterior

curve, so the character of the scoliosis, caused by the same anomaly, may vary in different individuals.

The frequency of these anomalies in scoliotics is well illustrated by the clinic of the Massachusetts General Hospital. Of fifty consecutive cases in which careful roentgenoscopy has been made by Dr. Walter Dodd and Dr. Holmes, forty-four subjects showed bony defects in the sacrum or two lowest lumbar vertebrae.

Of the four patients showing no such lesions, two have infantile paralysis of five years' duration, involving the back muscles; one presents a case of syringomyelia; the others showed sharp dorsal curves with lateral deviation and rotation of the lumbar spine, but no bony anomalies in the lumbar or sacral region.

In the forty-four remaining cases above mentioned, the lesions found are as follows:

Anomaly of inferior articular processes of fourth lumbar	3 cases
Anomaly of inferior articular processes of fifth lumbar	7 cases
One large transverse process of fifth lumbar, Böhm type	2 cases
Failure of fusion, one pedicle, fifth lumbar	1 case
Overgrowth of right articular process of sacrum	1 case
Undergrowth of right articular process of sacrum	1 case
Articular process of sacrum forward	4 cases
Spina bifida first sacral segment with deformed process	9 cases
Anomalous fifth lumbar or first sacral vertebra which has rotated	12 cases
Anomalous sacrum	2 cases
Rotation of first two sacral segments on the third.	1 case
Collapse of one ilium	1 case

This gives an outline of what may cause scoliosis. Mistakes in interpretation may have been made, but by the assistance of Drs. Dodd and Holmes the findings in most of them are correct.

This study brings out the value of the flexed position. In attempting correction, not only should the thoracic spine be flexed, but the lumbar spine should be flexed on the sacrum, and the sacrum flexed on the lumbar spine; for flexion separates the articular processes and helps to get the sacrum forward under the spine.

The supine position with the foot-sling helps to draw the pelvis up and forward, while gravity pulls the trunk downward.

This study also suggests that in some of these cases, and possibly in many, operation should either precede or follow correction. In the first class it should be to replace the fifth lumbar centrum to its position on the sacrum, or to remove asymmetric overgrowth of the processes, which prevent restoring the base to a position of equilibrium; and in the second class to prevent recurrence of the deformity by means of bone graft to lock the fifth centrum to the sacrum; or on the articular processes to hold the vertebra in its place.

It is evident that the lumbo-sacral region is not thought to be the only region in which is found the congenital causes of scoliosis, but it is one of the most frequent sites of the cause in those cases occurring in girls about the age of puberty. At that age the lumbosacral angle increases, that is, the downward pitch of the inclined base; the ligaments are soft, due to rapid growth; the epiphyses have not all united, especially those of the iliac crest to which the iliolumbar ligaments are attached; and the body-weight is increasing.

Careful roentgenographic study of the whole spine is indispensable before any treatment of scoliosis is undertaken. Stereoscopic roentgenograms best show the position of the fifth lumbar vertebra in relation to the surrounding structures. In early cases the radiograms should be taken with the patient standing in order to show the position of the base in lordosis and in weight-bearing.

By the procedures of Forbes and Abbott some of the deformities of the spine may be corrected, but by these methods nothing has been done to remove the cause of the scoliosis. Will the corrected spine be able to maintain its equilibrium on the unstable base, from which this spine has already fallen? Should not this point be considered before subjecting a patient to the discomfort of a forcible correction?

I wish to thank Dr. Dodd and Dr. Holmes for their interest and assistance in this work.

166 Newbury Street.

ABSTRACT OF DISCUSSION

DR. HARRY HUDSON, Philadelphia: About 1908, I reported a case of congenital scoliosis with not only structural but also numerical variation. There were thirteen ribs on one side and fourteen on the other; two supernumerary vertebrae were interposed, and there was fusing of two of the ribs. This case showed me the possibilities in the way of structural changes as the cause of scoliosis; and while I have not carried out studies on this, as Dr. Adams has done, I have been careful in my roentgenoscopies since then. I now have four cases of asymmetrical sacralization of the lumbar vertebrae; one case of supernumerary half-vertebra interposed, causing an angulation of the spine; and another case of numerical changes in the ribs. I theorized considerably on this question but I did not have the energy to carry the theory out, that many cases of scoliosis must be due to some congenital malformation. That is, we cannot explain why children of ordinary good physique and musculature should suffer from so-called faulty positions, when other children of less muscular ability who have been subjected to the same conditions do not seem to have any trouble. This point should be investigated, and if we follow that line in roentgenoscopies in our cases of scoliosis we shall find more frequently, probably, minor changes in the facets and the spine. I think that they are often there and are a deciding factor in so-called cases of static scoliosis.

DR. JOHN DUNLOP, Washington, D. C.: Dr. Adams did not seem to go very much into the question of treatment. What has he to suggest in that line?

DR. Z. B. ADAMS, Boston: With regard to the question of numerical variation, I would call attention to the admirable work of Dr. Böhm, in which he followed out Dr. Rosenburg's theory of cranial or caudal progression, to explain the occurrences of the various anomalies. Certainly Böhm deserves tremendous credit. I think that although in Germany Dr. Kollicker has done some work before, yet this work of Böhm was excellent. Many of these changes, however, are not due to numerical variation; that is, to asymmetrical sacralization. It is possible to have this in all degrees without any scoliosis. Asymmetrical sacralization is found in Roentgenray clinics. In taking roentgenograms for suspected stone in the kidney or pain in the back we find the broad wing and no scoliosis, and this is borne out by the collection in the Warren Museum. Out of this collection there was but one that showed scoliosis, and that one shows asymmetrical sacralization with the absence of the neural arch of the first sacral segment. This allows the fifth lumbar vertebra to tilt back on one side, hence is the cause of the scoliosis. Each case must be studied by itself, with the mechanics of this portion of the spine borne carefully in mind. Concerning treatment, in the very early cases a great deal can be accomplished by teaching the children to stand in a proper position, that is, when the processes are small and show an inclination to unlock. That inclination is best shown when

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the roentgenogram of a child is taken in the standing position, with the lumbar spine in the position of lordosis and weight-bearing. It can be treated by exercises for the purposes of muscular development, producing a flat back and no lordosis. In the more severe cases, with a large transverse process on one side, surgical measures are demanded.

PLAGUE IN HAVANA

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The first case of plague known to occur in Havana, Cuba, was discovered July 6, 1912, in the person of a Spaniard residing at No. 2 Mercaderes Street. Two additional cases occurred July 12 and 22 at Justiz and Baratillo streets, about four blocks distant from the first case. The district involved in this infection is about three blocks from the water front and in the wholesale commercial district of the city.

The infection was at first supposed to have been imported from Porto Rico, the capital of which, San Juan, was at the time plague infected. Subsequent investigation, however, by the Cuban health authorities, indicates that the infection was a direct importation from the Canary Islands, where plague was present at the time, though concealed and stubbornly denied by the Spanish authorities.

Owing to the early discovery of the disease and the thorough and excellent work of the Cuban Sanitary Department this outbreak was confined to the three cases mentioned above.

About one year and a half later, that is, Feb. 22, 1914, the first case of plague of the present outbreak was discovered in Havana at No. 1 Officios Street, which is in the block adjacent to that in which the first two cases occurred in 1912. Whether this second appearance of plague was simply a continuation of the old infection or a new importation is a moot question. The former is the more reasonable view and is supported by Dr. Juan Guiteras, Director of Health of Cuba. The case of February 22 was followed by twenty-four other cases, making a total of twenty-five within the city of Havana. The last case occurred June 22.

Two other cases were found in the neighborhood of Havana, the first at Artemisa, 45 kilometers to the southwest of the city, April 18, the second at San Jose de las Lajas, a town about 25 kilometers southeast from Havana, June 15. As the infection in both these cases was clearly traceable to Havana and they were treated in that city, these properly belong with the Havana series.

May 30 an infected rat was found in the freight station in the town of Jaruco, 37 kilometers to the eastward of Havana on the railway between that city and Matanzas. The station and surrounding structures were disinfected and there were no further developments.

June 23 a case suspicious of plague was reported from Santiago de Cuba in the eastern extremity of the island. Later it was confirmed, after inoculation tests and the exposure of guinea-pigs in the infected locality had shown positive results. Plague-infected rats were found about the same time.

It may be considered as more than probable that the spread of plague infection outside of the original focus in Havana was due to the action of a Mr. Gonzales, a wholesale provision merchant who, when one of his employees sickened with what he thought might be plague, and later was confirmed as such, concealed it, and, knowing that as soon as the case was discovered his warehouse would be quarantined and fumigated, disposed of as much of his stock as possible, sending it to various parts of the city of Havana and throughout Cuba, including the subsequently infected points, San Jose de las Lajas, Jaruco and Santiago de Cuba. He is at present being prosecuted before the courts.

It should be observed that two weeks prior to the appearance of the first case of the present outbreak in Havana, the sanitary authorities had noted some rat mortality. Anti-rat measures were put into effect at once, even before the discovery of the first human case of plague. With a few exceptions all the cases may be traced directly or indirectly to the original focus near the Havana water front.

A secondary well-marked focus developed later in the extensive stables of the Department of Public Works in Figuras Street. Two infected rats were found here, the first, April 17, the second, April 24. These are the only infected rats found in Havana. This focus gave rise to six cases.

On account of the character of the stable buildings and grounds, disinfection by the usual methods was futile and the Sanitary Department decided to destroy the infection by fire. The stables and everything within them, except the animals, carts and harness, were converted into ashes, April 25. This radical measure was effective in destroying a very menacing focus of infection. No other case developed from this source, except perhaps Case 25, in which the place of business of the patient, No. 2 Concha Street, was on the route taken by the employees, animals and equipment of the stables destroyed, when they were moving into new quarters.

SANITARY ORGANIZATION

Sanitary measures throughout the Island of Cuba are under the control of the Department of Health and Charities, the head of which is a cabinet officer. The secretary of this department, which is, in truth, a department of public health, is at present Dr. Enrique Nunez, a physician of ability. The actual work of sanitation, however, is in charge of the Director of Health, Dr. Juan Guiteras, and a very capable corps of assistants.

Every municipality throughout the island has a chief sanitary officer reporting to the Director of Health. In Havana the government maintains the well-known "Las Animas Hospital" for the care and treatment of all cases or suspected cases of communicable diseases, which hospital is in charge of the Director of Health, as is also the well-equipped laboratory connected with the department. In normal times a personnel of about 100 men is kept on duty inspecting, fumigating and rat-catching. In times of epidemic outbreaks, as in the present case, this number is very materially increased. An official bulletin is published monthly by the department, containing interesting morbidity and mortality statistics and original articles of value, the more important being published in Spanish, English and French. The general organization of the department makes for quick and efficient work.

The sanitary measures put in force during the present outbreak of plague are directed primarily against

the rat and flea and may be considered under the following headings:

INSPECTION

The relation existing between the inhabitants of Havana, the hospitals and the medical profession is such that thorough inspection is facilitated. The Spanish-born population of Havana maintains its original provincial character by becoming affiliated to social and mutual aid societies named after the Spanish provinces from which they come. We thus find the "Gallego" Center, the "Asturian" Center, etc. In addition to these regional centers, or societies, there is a rich and powerful organization known as the "Association de Dependientes" (Association of Employees), to which all Spanish and Cuban employees are eligible to membership, although it is largely made up of the former. The three associations mentioned have a combined membership of about 75,000 men. The importance of these centers from a sanitary point of view is that all these organizations maintain excellent hospitals and dispensaries for the benefit of their members who, when ill, are only too glad to report at once to the medical officers in charge for treatment. These hospitals are known by the euphonious title of "Quintas de Salud," or health villas.

Citizens of Cuba not affiliated with the societies mentioned above, when ill, are entitled to the benefits of the state dispensaries, maintained by the state under the direction of the Department of Health and Charities. The sanitary inspectors of this department respond to the calls made on them by those in need of medical assistance and investigate reports of disease made by the police authorities, taking such action as the case may demand.

The well-to-do are, of course, treated by their own physicians, who in accordance with the sanitary laws and regulations must at once report to the health authorities all cases of communicable diseases. In the present instance strict enforcement of these regulations is made possible by the almost unanimous interest and cooperation of the medical profession of Havana, which is working in entire accord with the Department of Health and which, if anything, is at times too quick in reporting suspicious cases.

From the foregoing it will be seen that inspection is thorough and well under control of the sanitary authorities. All suspicious cases are at once removed to one of the Quintas de Salud or to Las Animas Hospital. Under no circumstances are patients with quarantinable diseases treated at their homes.

DIAGNOSIS

The definite diagnosis of cases of an epidemic disease is secondary only in importance to a well-established inspection service; in fact, it is of equal importance in epidemiologic work. This is well provided for in Havana. All cases of illness of a suspicious nature are reported to the Director of Health, who at once convenes a legally appointed board, known as the "Commission of Infectious Diseases." This commission consists of five members, including the Director of Health. The appointments are non-political and are based solely on high professional standing and recognized diagnostic ability. The findings of the commission are absolute and not subject to review by other authority.

In drawing its conclusions, so far as plague is concerned, the commission depends on four factors, to-wit: (1) clinical symptoms, (2) the microscopic examination of the body liquids, (3) cultures from these, and (4) results of inoculation of susceptible animals.

A diagnosis of plague is never made on the clinical symptoms alone; one or more of the other factors must be positive. With the diagnostic work in the hands of competent men the chances of error are small, but they may occur and in fact have occurred in one or two instances. In each of these cases the commission has demonstrated its sincerity and frankness by revising its diagnosis. For instance, in Case 2, the first three factors were negative of plague and the fourth having also failed to give positive results after the usual time, a negative diagnosis was rendered; yet, when the inoculated animal was killed on the tenth day and the lesions of plague found, the case was at once announced as positive, although the patient was at the time practically well.

DERATIZATION

Since the first outbreak of plague in 1912, deratization has been constantly practiced in Havana. Two weeks prior to the recognition of the first case in the present outbreak it was extensively carried on, owing to the reports of the finding of dead rats by the sanitary inspectors. The work has been actively pushed up to the present time, and all rodents caught or killed are examined for plague in the laboratory of the health department. Over seventy thousand rats have been examined since 1912, and only two found plague-infected, both during the present outbreak, the first, April 17, the last, April 24.

RAT-PROOFING

Havana has the advantage that its buildings are to a great extent rat-proof in structure or can be easily made so. During the outbreak of plague in 1912 almost the entire commercial district was rat-proofed. This work is now being actively pushed whenever it is required, in the infected area or elsewhere.

In accordance with an order recently issued and applicable throughout the Island of Cuba, a fine will be imposed on any person on whose premises rat holes or runs are found. The order goes into effect six months after date of publication.

In connection with deratization and rat-proofing it is interesting to note that the sewerage system of Havana is now practically completed and was put in operation March 1, 1913. It is one of the most complete systems ever devised and the cost of the entire work when finished, including the conduits for surface drainage, will amount to about $23,000,000.

A few of the former sewers in old Havana draining into the harbor are still used in part. They are closely connected with the main infected district and it is quite possible that they harbor rats. They have been thoroughly fumigated, but it is the intention of the sanitary authorities to open them up so as to get an exact idea of conditions.

While the sewerage and drainage systems are excellent in construction and will serve to advance the general sanitary conditions of the city, the best results cannot be expected as yet, for the reason that the house connections are faulty. This is now being attended to. Of the 20,000 houses in Havana, 5,000 have been examined, and when the connections were not properly made the defects have been removed. The work of inspection will continue until all connections are made sanitary.

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DISINFECTION

The agents for this purpose are hydrocyanic acid gas, sulphur dioxid, phenoco and a similar phenol disinfecting fluid, steam and fire. In fumigation work hydrocyanic acid has given excellent results and is preferred to sulphur dioxid. The method employed in its use is as follows:

The capacity of the space to be fumigated is first calculated, and the amount of potassium cyanid and sulphuric acid required determined in accordance with the following standard: For every cubic meter, 20 gm. commercial potassium cyanid, 40 gm. crude sulphuric acid, and about 100 c.c. water. The potassium cyanid is divided into convenient parts and each enclosed in three thicknesses of manila paper. A number of earthenware, or better, wooden vessels corresponding to the number of packages of potassium cyanid to be used are then provided and distributed about the building. Into these vessels is poured the aqueous solution of sulphuric acid. All openings having been closed except that of exit for the operators, the packages of potassium cyanid are thrown into the receptacles containing the sulphuric acid, the operators retreating toward the exit, which is sealed when the last receptacle is put in operation. The time of exposure varies from six to twelve hours, usually the latter.

The success of the operation without harmful results to the operators is based on the paper packages of potassium cyanid. As before stated, the chemical is protected by three layers of manila paper bagging, great care being taken that there are *no* holes in the paper, and by actual laboratory experiment it has been determined that from twenty to twenty-five minutes will elapse before the sulphuric acid solution destroys the paper envelope and the chemical action begins setting free hydrocyanic acid gas.

This gives ample time for putting in operation the number of receptacles necessary even in large and irregular buildings. The amount of potassium cyanid in the packages varies, according to the amount and distribution of the space to be fumigated. Packages ordinarily contain 1, 5, 10 or even 20 kg. of potassium cyanid. In actual practice the best and cheapest receptacle has been found to be the wooden barrels used for packing lard.

The effects of hydrocyanic acid fumigation are striking. No living thing seems to escape its lethal action, while inanimate matter is left unscathed. Merchandise, silks and satins, metals, foodstuffs, none are in any way injured by its presence. It is an ideal substance for fumigation, when plague or yellow fever are concerned, but its germicidal power is weak.

For fumigating small spaces such as rat-holes, runs and caves, Dr. Hugo Roberts, Chief Quarantine Officer of Cuba, has devised a simple, cheap and efficient apparatus. It consists of a wooden box 12 by 4 inches with a false bottom with two circular openings into which are inserted two 1,000-c.c. bottles with rubber stoppers, each perforated with two openings to permit the passage of the glass tubing connecting the two bottles and each in turn to the rubber bulb and the outlet tube, to which, for convenience, a glass nozzle may be attached.

The bottle to which the rubber bulb is connected is charged with sulphuric acid diluted with two or three times its volume of water. The bottle to which the rubber tube and glass nozzle is attached is charged with powdered potassium cyanid. By means of pressure on the bulb the acid solution is forced into the bottle containing the cyanid. Chemical action is at once set up and hydrocyanic acid gas rapidly evolved, passing out through the glass nozzle which has been previously inserted into a rat-hole, the open space around the nozzle having been sealed with a dash of cement mortar.

The box is fittted with a movable handle which serves several purposes, to-wit: (1) convenience in carrying about, (2) facilitates the removal of the bottles for recharging, and (3) serves as a rest for the exit tube in order to avoid kinks and the consequent interference with the escape of the gas.

The apparatus may be made of any convenient size. For small rat-holes the size described above is used; for larger holes bottles having a capacity of 5,000 c.c. are employed. In the larger size the air, tube is attached to a bicycle pump instead of the rubber bulb.

Larger sizes than this have not been used; but, if necessary, it seems quite possible to greatly enlarge the instrument up to the size, let us say, of the ordinary formaldehyd autoclave, placing it on a truck or carriage so that it can be carried about with ease.

The small apparatus is charged with 150 gm. of powdered commercial potassium cyanid and about 300 gm. of crude sulphuric acid, diluted with three times its weight of water. This is calculated to yield 10 cubic meters of 1.6 per cent. hydrocyanic acid gas. In a confined space the percentage of hydrocyanic acid gas will be materially increased.

The apparatus is now extensively used in the anti-rat campaign in Havana.

Sulphur dioxid is used principally for fumigating sewers and for the purpose of determining their connections with rat-runs and caves. Steam is employed in the disinfection of bedding and clothing, etc., at Las Animas Hospital.

Fire, as previously mentioned, was used to destroy in its incipiency the focus in the stables of the Department of Public Works. Six patients were infected here, and as it was impossible to disinfect these stables by ordinary methods, they were ordered to be burned under the direction of the fire department.

Phenoco and a similar phenol disinfecting fluid are utilized for washing floors, walls, etc. The germicidal power of the former has been standardized according to the methods employed by the U. S. Public Health Service and found to be from fifteen to sixteen times stronger than phenol (carbolic acid).

The modus operandi in the disinfection of a building is as follows:

1. Fumigation with hydrocyanic acid gas.
2. Diligent search for rat-holes, which when found are fumigated with hydrocyanic acid with Dr. Robert's apparatus.
3. Tracing rat-holes, for which purpose, if necessary, floors and walls are removed and opened.
4. Washing floors and walls with phenol disinfecting fluids.
5. Inundation with mild solution of a phenol disinfectant.
6. Rat-proofing.

It is interesting to note that no secondary cases have occurred after the disinfection of a locality.

DEPOPULATION AND SANITARY CORDON

One of the most striking features of the anti-plague campaign in Havana has been the depopulation of seventeen blocks, in the center of the commercial dis-

trict of the city and the throwing of a military cordon about this zone, within which were located the two principal foci of infection. The depopulation was carried out under the authority of a section of the sanitary code which empowers the health authorities to close any house, building or establishment which is considered dangerous to the public health.

The depopulation was practically completed within twenty-four hours. Nothing was removed from the zone. The well-to-do were allowed to go where they pleased after leaving their new address with the sanitary department. Those who were in want, or could not afford to move elsewhere, were sent to the quarantine camp at Trisonia and there maintained at the government's expense.

The entire zone was then disinfected block by block, including the sewers connected therewith, beginning at the point furthest from the harbor and advancing toward the water front. That portion between the lower end of the zone and the wharves was also fumigated. All buildings not rat-proof were made so. Three weeks elapsed before the "zone" was opened up and the inhabitants allowed to return.

Taking everything into consideration, the work of depopulation was carried out without undue friction. Of course, there were a number of violent objectors, upheld by a small portion of the press; but on the whole the people affected took the matter sensibly and with good humor.

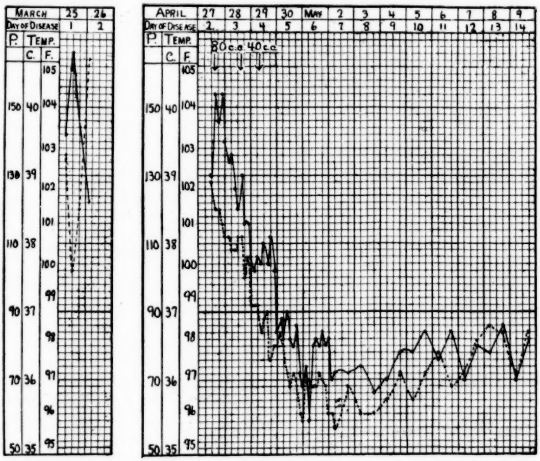

Chart 1.—Clinical chart of Case 5, storehand, aged 12, native of Spain, with septicemic plague. Death in thirty-six hours. In this and the following charts, the temperature is indicated by the solid line and the pulse by the broken line.

Chart 2.—Clinical chart of Case 10, laborer, aged 29, mestizo, Cuban, with bubonic plague. Type of severe case ending in recovery.

INTERNAL QUARANTINE

No restrictions were placed on personal travel. Coastwise vessels are fumigated at Havana and all freight capable of harboring rats fumigated, except such freight as might be certified as coming from interior non-infected points and loaded directly from a rat-proof wharf.

OUTGOING QUARANTINE

Vessels leaving for foreign ports are fumigated for rats by the Cuban authorities on request. The Cuban quarantine regulations require the fumigation of all vessels that have docked at Havana and are bound for Cuban ports. Such vessels are fumigated in the stream immediately before sailing. Hydrocyanic acid gas is used for this purpose with excellent results. Vessels bound for the United States via Cuban or foreign ports are fumigated with sulphur by the Cuban authorities, under the supervision of the U. S. Public Health Service, and a certificate to that effect is issued. A brief summary follows of the outgoing quarantine measures enforced by the United States Public Health Service against vessels, passengers and cargo bound for United States Ports.

1. Vessels to be fumigated every thirty days. This was continued until about the middle of May. Subsequently the time between fumigations was made fifteen days.

2. All vessels to have approved metallic rat-guards on all lines and to be fended from the wharf at least six feet, gangways to be raised at night unless loading. With the precautions mentioned above, vessels were allowed to dock at rat-proof wharves except during the first few weeks, when they were compelled to anchor in stream. Bills of health were refused to vessels unloading at non-rat-proof wharves unless fumigated in the stream when empty and loading from lighters.

3. Vessels anchored in the bay are required to take the same precautions as above, and all lighters must be removed from the side at night.

4. The fumigation of all parts of the vessel simultaneously without cargo. Amount of sulphur was at first 3 pounds per thousand cubic feet without cargo and 4 pounds with cargo. Time of exposure six to twelve hours, respectively. At the end of April this was changed to 4½ pounds of sulphur and twelve hours' exposure in *all* cases, with the exception that living quarters were given only six hours.

5. Up to April 15, crews were not allowed ashore. Subsequent to this date they were permitted to land between sunrise and sunset. June 26, masters of vessels were given permission to go ashore at all times.

6. Personal health certificates to the effect that the party interested had not been within the infected zone for a period of seven days were issued from March 7 to April 15. After that date only inspection of passengers and the taking of temperature of second-class and steerage passengers was required.

7. First-class passengers in transit were not allowed to go ashore until April 16, when they were permitted to do so between sunrise and sunset. Second- and third-class passengers in transit have not been allowed ashore at any time.

8. No cargo liable to harbor rats has been allowed aboard unless passed by an inspector or fumigated.

9. Fruit coming from non-infected points in crates not rat-proof was allowed to be loaded subject to inspection. The fruit must not be stored in Havana, but must be loaded direct from the cars to the vessels from approved wharves or by means of lighters loading from them.

CLINICAL NOTES ON PLAGUE AS OBSERVED IN HAVANA

With four exceptions all the cases of plague in Havana, including those which developed in Artemisa and San Jose de las Lajas, were observed by me at some time during the illness. There was a total of twenty-seven cases, including the two occurring in the vicinity of Havana. The latter for all practical purposes belong to the Havana series, the infection being clearly traced to that city. Of the total, six cases ended fatally, giving a case mortality of 22.2 per cent., which is very low, lower it is believed than has been registered in other known epidemics of plague.

All the cases were of the bubonic type with the exception of Case 5, in which the *Bacillus pestis* was found in the blood, no glandular enlargement being apparent. The case ended fatally within forty-eight hours. Of the bubonic cases all were of the femoral or inguinal variety save two in which the axillary glands were involved. In one of the latter cases the axillary bubo was followed by involvement of the cervical glands near the angle of the jaw, and, strange to say, of the opposite side. This case terminated fatally within seventy-two hours. In one case, No. 11, the initial bubo appeared in the glands above Poupart's ligament.

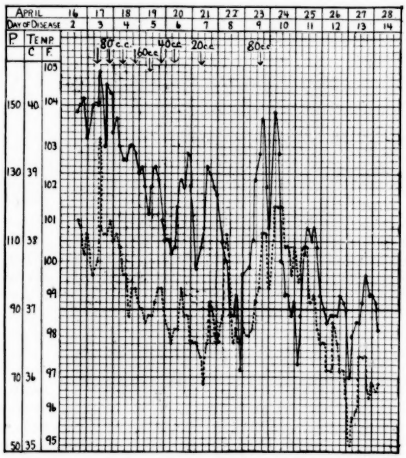

Chart 3.—Clinical chart of Case 13, laborer, aged 20, negro, native of Cuba, with bubonic plague. Type of mild case. Dissociation between pulse and temperature may be noted on the second and fourth days of the disease.

In the remaining twenty-four cases the bubo first appeared in the femoral region. Later, however, as the disease progressed, the inguinal glands above Poupart's ligament became involved, and in the majority of the cases the surrounding cellular tissues showed distinct signs of infiltration. As a rule the buboes were very painful and tender to the touch. With two exceptions the buboes suppurated and were opened, the healing process thereafter being long and tedious. There have been no cases of pneumonic plague.

Clinical charts of Cases 5, 10 and 13 are herewith appended. They are interesting as showing three different types of plague. Chart 1 represents a septicemic case ending in death in thirty-six hours. Chart 2 records a typically severe case ending in recovery. Chart 3 shows a mild case. In some of the first cases, a dissociation between the pulse and temperature, such as occurs in yellow fever, was observed. A study of the entire series of cases shows, however, that this symptom is not at all constant. Albuminuria was present in all the cases. The amount of albumin was greater than that found in the hyperpyrexia of typhoid and malarial fevers, and the presence of epithelial casts shows that the kidney is seriously involved. The amount of albumin, however, never even approaches that found in yellow fever, with the same febrile movement, that is from 39.5 to 40.5 C. (103.1 to 104.9 F.).

As in other acute infectious diseases, plague may manifest itself in a very mild form, and may be entirely overlooked unless all means at command are exhausted before determining the diagnosis. Cases 2 and 26 of the Havana series are excellent examples of this. In both it was only by painstaking inoculation and cultural tests that the true nature of the disease was finally established.

TREATMENT

The treatment has consisted of intravenous administration of massive doses of Yersin serum, 80 c.c. being administered twice daily during the first three or four days of the disease, or in fact so long as the temperature remains above 39 C. (102.2 F.), the doses diminishing gradually as the temperature falls. Over 500 c.c. of Yersin serum have been administered to one patient in divided doses. The height of the temperature is the guide for the quantity and frequency of serum administration. After suppuration has occurred, and the temperature is wholly or in part due to this process, the fever no longer serves as a guide, and in fact it is found better then to stop the serum altogether. The ill effects of these large doses of serum are counteracted by the administration of calcium chlorid, 1 or 2 gm. daily.

This treatment has given excellent results, as may be seen from the case mortality, which is, as before stated, but 22.2 per cent.

Other general symptoms are treated as they arise, depression by stimulants, principally strychnin, irritability and other cerebral symptoms, by anodynes, particularly drop doses of tincture of opium, diminished renal activity, by hexamethylenamin. Warm wet applications are applied to the bubo, which is opened so soon as suppuration is apparent.

CONCLUSIONS

The following conclusions, I think, are warranted from the above résumé of the history of the late outbreak of plague in Havana:

1. That plague, like other epidemic diseases, may be controlled and eradicated with comparative ease if the health authorities are given the necessary legal and financial power to carry out sanitary measures.

2. That in antiplague work passenger traffic need not be interfered with. In other words, the human plague case is a negligible factor in a well-organized antiplague campaign.

3. That the measures adopted by the U. S. Public Health Service to prevent the introduction of plague from Havana into the United States were effective.

4. That the intravenous administration of large doses of Yersin serum during the active infective period of the disease seems to be the best mode of treatment known to us at present.

CYSTIC ODONTOMAS *

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ROCHESTER, MINN.

The subject of cystic odontomas has not received in this country the same study that it has in England, Germany and France. The importance of the subject is readily appreciated when one considers the marked deformities of the face and jaws that accompany these growths, which early diagnosis and thorough operation might have eliminated in many cases.

Cystic odontomas will be considered under two classes—the simple cysts and the adamantinomas. The simple cysts are again divided into two types: Type A, including the cysts commonly called dental or root cysts, and Type B, those usually called follicular cysts and containing a partially formed tooth. The term "follicular" cyst used for the second type is misleading in that one takes for granted, without knowing definitely, that this type is developed from the follicle of a tooth. The term "dentigerous" cysts is used quite loosely and may refer to either of the foregoing types of simple cysts. For this reason, it has not been used in my classification.

Fig. 1 (A 89376).—Adamantinoma. Woman, aged 50. Duration of tumor, twenty-one years.

Twenty-six cystic odontomas are herein reported from the Mayo Clinic. Twelve of these are simple cysts of Type A; six are of Type B, and eight are adamantinomas.

SIMPLE CYSTS OF TYPE A

The simple cysts (Type A) are the most common cysts of the jaws. Because of their little surgical importance, they have not received the attention which has been given to other cystic odontomas. Magitot[1] in 1872 published the first important work on the subject of cystic odontomas, and attributed their origin to the development of the embryonic dental tissue. Malassez[2] in 1885 found masses of cells about the roots of teeth in the jaws of adults and concluded that these were the remains of the dental ridge, the epithelial cord and the outer layer of the enamel-organ. These cells may be found near the teeth and are sometimes found deep in the jaws. Malessez called these masses of cells *débris épithéliaux dentaires*, and proposed the theory that all cystic odontomas were derived from this group of cells. This theory is the one most commonly accepted.

According to Scudder,[3] this type of cyst is found more commonly in the upper jaw in the incisor and bicuspid regions. Of the twelve cysts of this series, six occurred in the upper jaw and six in the lower. Of those in the upper jaw, four occurred in the incisor region, one in the bicuspid region, and in one case the location was not noted. In the lower jaw, three occurred in the incisor region, two in the bicuspid region, and one in the molar region.

The typical mammalian dentition consists of forty-four teeth, and man has but thirty-two, a third incisor, a third bicuspid and a fourth molar being missing. The most frequent location for the appearance of supernumerary teeth is in the upper jaw in the incisor and bicuspid regions. Whether these teeth are a reversion to the earlier types in the mammalian dentition or simply mishappenings is a questionable point among those who have made a thorough study of the subject. It is interesting to note that this type of cyst and the supernumerary teeth most frequently occur in the same location, which might suggest that these cysts are derived from supernumerary anlagen.

The theory has been held for some time that these cysts develop from irritation or stimulation. The irritating factor may be the eruption of a tooth or some form of peridental inflammation. These cysts are frequently found in connection with the dead roots of teeth and thus the irritative factor, necessary to stimulate their growth, is accounted for.

Simple cysts of Type A occur at almost any age. Of the twelve cases reported in this paper, the youngest patient was 12 years of age and the oldest 70. The cyst is usually about the size of an English walnut, but may attain great dimensions, and in the upper jaw, simulate an empyema of the antrum. In the lower jaw it may become as large as an orange. The cysts from our series varied in size from that of a cherry to that of a small lemon. Witzel[4] found tumors the size of a pea and smaller about extracted teeth. They were placed sometimes near to and sometimes distant from the root of the tooth. They contained fluid and had an epithelial lining indistinguishable from a larger cyst. The cysts have a smooth mucous membrane covering in the mouth; the wall varies in thickness and consists of a thin shell of bone (Fig. 5).

SIMPLE CYSTS OF TYPE B

Malassez[2] believes that this type of cysts also originates from cells that he describes in the jaws. Bland-Sutton,[5] however, believes that this type simply represents an expanded tooth-follicle.

* Read before the Section on Stomatology at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

1. Magitot: Arch. gén. de méd., 1872, ii, 339.
2. Malassez: Arch. de physiol. norm. et path., 1885, v, 129.
3. Scudder: Tumors of the Jaw, Philadelphia, W. B. Saunders Company, 1912.
4. Witzel: Ueber Zahnärztl Cysten, Leipsic, 1896.
5. Bland-Sutton: Tumors Innocent and Malignant, New York, Cassell & Co., 1901.

These cysts occur in either jaw with about equal frequency and usually in the bicuspid and molar regions.

Of the six cases in our clinic, three were found in the upper and three in the lower jaw. Of the three in the upper jaw, one occurred in the bicuspid region, one in the molar region, and in one case the location was not noted in the history. Of the three in the lower jaw, one occurred in the bicuspid region,

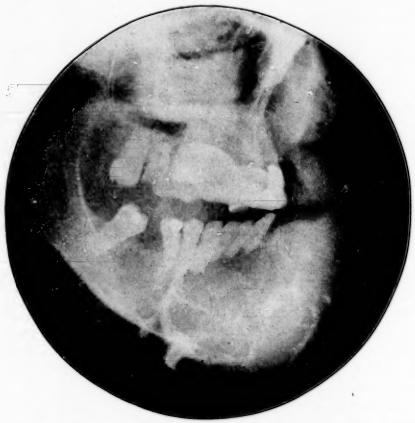

Fig. 2 (23705).—Roentgenogram of case in Figure 1, showing entire absence of ramus of jaw on right side and the tumor extending across midline to bicuspid region on left side.

one in the anterior part of the jaw, and one in the molar region.

This type of cysts occurs during or shortly after the second dentition, except those in connection with the third molar, which develop later in life. Although this fact is commonly known, this type of cyst may not cause symptoms or be noticed until later in adult life.

Of our cases, other than those in which the cyst occurred in the third molar region, the ages of the patients were 3, 14 and 28 years; of those in the third molar region, the ages were 27, 34 and 37 years.

It is noted that a tooth is missing from the set and a partially developed one found in the cavity of the cyst. The crown of the tooth is usually complete and the root partially formed. These cysts occur about a partially developed permanent tooth and are rarely seen about a supernumerary tooth.

In one of our cases the cyst occurred in a man 69 years of age. He had had a tumor of the lower jaw near the angle for forty-two years, and during the last six months it had increased in size and the surface had become ulcerated in the mouth. The roentgenogram showed a cyst with a partially developed molar tooth. A specimen from the growth, on microscopic examination, proved to be epithelioma. The extensiveness of the growth and the glandular involvement made the condition inoperable.

This type of cyst has similar characteristics as to size as the cysts of Type A. The wall consists of thin bone and the mucous membrane covering in the mouth is quite smooth.

ADAMANTINOMAS

The adamantinomas, on account of their greater surgical importance and their interesting features pathologically, have given rise to more study than the other types of cysts. Falkson[6] in 1879 held that, in the formation of enamel-organs for the several teeth, there was a surplus of those formed and that these additional dental germs were the origin of the adamantinomas. Malassez' theory as to their development from the epithelial masses found in the jaws is accepted by most observers. Kruse[7] agrees with Malassez as to the origin of the cysts and reports three cases, each one typifying different stages in the development of the cells of the enamel-organs. Büchtemann[8] and Kolaczek[9] believe that these tumors originate from the mucous membrane or from the mucous glands of the mouth. Bland-Sutton[5] and others hold that they are formed from the oral mucous membrane. Bland-Sutton's argument against Malassez' theory is that they occur in middle life and that if they were derived from the embryonic enamel-organ, they should occur at an earlier period in life. Hesse[10] agrees with Falkson[6] as to the origin of these tumors from a surplus of enamel-organs.

The adamantinomas are most frequently seen in the lower jaw. Lewis[11] states that they are seen eleven times more frequently in the lower than in the upper jaw. The bulk of the tumor-mass is usually at the angle of the jaw, extending upward to the ramus and forward into the body of the jaw. Sometimes the entire ramus is cystic with the tumor extending across the midline to the other side of the jaw. These tumors may originate in the molar or bicuspid regions, but

Fig. 3 (13523).—Adamantinoma in woman, aged 22. Duration of tumor, eight years. Tumor involving left half of lower jaw.

are rarely seen originating from about the anterior teeth (Fig. 2).

6. Falkson, Robert: Beitrag zur Entwicklungsgeschichte der Zahn Anlage und Kiefer-Cysten, Königsberg, p. 33.
7. Kruse: Virchows Arch. f. path. Anat., 1891, cxxiv, 137.
8. Büchtemann, cited by Borst: Lehre von den Geschwülsten, ii, 607.
9. Kolaczek, cited by Borst (Footnote 8).
10. Hesse: Deutsch. med. Wchnschr., 1912, xxxviii, 1360.
11. Lewis: Surg., Gynec. and Obst., January, 1910, p. 28.

I have been able to collect nine cases in which the tumor occurred in the upper jaw, two from the Mayo Clinic. In only four of the cases reviewed in the literature were there definite data as to the location in the jaw. Four of the nine occurred in the posterior part of the jaw and two in the cuspid region. These cysts may originate close to the alveolar border or may start from deep within the jaw. Of the eight cases of

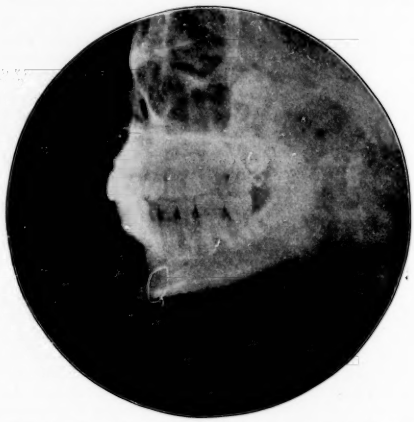

Fig. 4 (13523).—Same case as Figure 3, showing transplanted rib in place after resection of tumor by Dr. Judd. Transplant healed nicely.

adamantinomas from our clinic, six occurred in the lower jaw and two in the upper. Of the tumors in the lower jaw, in four the main mass was located in the angle of the jaw, in one in the molar region, and in one in the bicuspid region. Of those in the upper jaw, one occurred well back in the molar region and one in the cuspid region (Fig. 1).

These cysts may develop at any age. Massin[12] reports a case in a new-born infant and cases have been reported late in adult life. Lewis[11] states that the average age of the patients in the seventy cases which he collected in the literature was 33. The average age of the patients in our group of cases is 27¼ years. Of the six cases from the literature in which the tumor occurred in the upper jaw, the average age of the patients with occurrence in the molar region was 33½ years, and of those with occurrence in the cuspid region, 16½ years.

Stumpf[13] says that if either of the theories which have been advanced for the etiology of the formation of these cysts is accepted, one must assume some additional irritant factor as necessary in their production. The lower molar region receives more irritation than any other locality in the mouth. It is an accepted fact that the lower third molar is more difficult to erupt and more frequently impacted than any other tooth in the mouth. It is interesting to note that it is in this region and at the average age of 33 years during or just at the time of the eruption of the lower third molar that these cysts occur; and, also, that of the cases in the literature in which the upper jaw was affected, the average age of the patients having adamantinomas in the molar region was 33½ years, while that of patients with involvement of the cuspid region was 16½ years. This suggests that the eruption of the teeth may play an important part in the chronic irritation which is probably necessary to stimulate the growth of these tumors. If these conditions develop from supernumerary anlagen, the different locations in the molar region may be explained by the fact that, according to Black,[14] the supernumerary molar tooth may occur in any location posterior to the first molar. The adamantinomas are sometimes associated with cysts containing partially formed teeth, but not frequently enough to make this a factor in the etiology.

It is difficult to obtain conclusive evidence of the association of the eruption and impaction of teeth to adamantinomas, as most histories are not of sufficient detail on this point. Hesse[10] in 1912 reported a case in which a lower third molar was found in connection with an adamantinoma, and believes that from a study of this case he will be able to find out more about these tumors. Two of the adamantinomas in our clinic were associated with unerupted third molars, one in the upper and one in the lower jaw.

Of the seventy cases that Lewis collected from the literature, the average duration of symptoms was eight and one-half years. The duration of the symptoms in our cases was from ten months to twenty-one years. Most of the cases were of more than ten years' duration; but the exact duration of these tumors is difficult to determine on account of the long standing of the condition.

None of the cases reported in this paper had any glandular enlargement.

Fig. 5 (12017).—Girl, aged 10. Duration, four months. Simple cyst, Type A, involving anterior of lower jaw.

These tumors present a smooth mucous membrane in the mouth unless they are infected. The wall of the cyst consists of a thin layer of bone. Crackling may be elicited in some areas, on pressure, where the bone is thin, and fluctuation may be found in others. These tumors may give rise to great pain when they are of large size, because of pressure of enclosed fluid. One

12. Massin: Virchows Arch. f. path. Anat., 1894, cxxxvi, 328.
13. Stumpf: Centralbl. f. allg. Path. u. path. Anat., 1910, xxi, p. 393.
14. Black: Dental Summary, 1909, xxix, 1, 83.

of our patients, who had had a tumor for twenty-one years, for some years, in order to relieve the pain, tapped the cyst herself, as the fluid accumulated, by means of a sterilized hat-pin.

Fig. 6 (A 59772).—Adamantinoma. Gross specimen.

PATHOLOGY

The lining of the simple cyst, Type A, consists of a layer of fibrous tissue and a thin layer of flattened epithelial cells. In the older cysts the latter layer may not be present, owing probably to the pressure of the enclosed fluid. Barrie[15] in 1905 reported a case of dentigerous cyst which was probably a simple cyst, Type A, with typical adamantine epithelium, with no down-growth, lining the cyst. This was the first case reported with this type of epithelium forming the wall of the cyst.

The lining of the simple cyst, Type B, consists of a fibrous tissue layer. Some observers have reported an epithelial lining for this type of cyst also.

The adamantinomas on section present solid and cystic areas. The cystic areas vary in size from that of the head of a pin to that of an English walnut. They appear to have a smooth lining, and fibrous or bony septa are seen separating the various cysts. The cysts contain a thin yellowish fluid. The solid areas have a red tint and present a granular appearance, owing to the many minute cysts.

Microscopically, the solid areas consist of a fibrous tissue stroma and columns of epithelial cells. These columns may be elongated, rounded or arranged in the form of acini, and may present many irregular forms. Two types of epithelial cells are found in these cell columns: the typical columnar cell with the nucleus placed near the pole away from the stroma, and the differentiated cells from this type—the polygonal cell and a stellate cell which form the main mass of the epithelial columns. These cells are analogous to the cells that form the enamel-organ. Areas of transitional forms from the solid cords to the small cysts are seen. The stellate cells are seen undergoing disintegration and their place being taken by cyst-cavities, at first quite small and then becoming larger. Stellate cells gradually disappear and are replaced by the fluid of the cyst. As the cyst increases in size, the columnar cells are alone left to line the cyst, while in the yet larger cysts these have disappeared and the wall consists of fibrous tissue only (Figs. 6, 7, 8, 9, 10 and 11).

15. Barrie: Ann. Surg., September, 1905, p. 352.

DIAGNOSIS AND TREATMENT

The diagnosis of the cystic odontomas, when the facts already noted are considered and with the aid of the roentgenogram, is usually not difficult. The roentgenogram will show a partially developed tooth, a unilocular cyst or the septa in the multilocular variety. The differential diagnosis from a giant-cell sarcoma is usually the most difficult, and this has frequently to be made at the time of operation or by microscopic examination.

The treatment of the cysts of the first group requires only a thorough curetting of the wall and packing the cavity with gauze. In the larger type, resection may be required to extirpate the tumor. The adamantinomas, however, require more radical treatment since the simple curetting of the cyst does not permanently cure the condition if a small area of the tumor is left. In time the condition recurs. A resection of the jaw should be made, if possible; in this way all the tissue of the tumor may be removed. Different appliances have been used, including metal splints to hold the fragments of the jaw in position after resec-

Fig. 7 (A 59772).—Adamantinoma. Cross-section, showing the solid areas of the tumors and the small and large cysts with bony walls.

tion, but the transplantation of a portion of rib seems to be the most satisfactory (Figs. 3 and 4.)

Recurrences are frequently noted in these tumors, especially when the treatment has been conservative. Bloodgood[16] reports twelve cases of adamantinomas. One case was inoperable, and in eleven cases resection of the jaw was done. Nine of these patients were well from one to twelve years. There was one recurrence after the patient had been well for eight years. One

Fig. 8 (A 68435).—Adamantinoma. Down-growth of the columns of epithelial cells and the various forms these take, surrounded by connective-tissue stroma.

died following excision of a huge tumor involving both sides of the upper jaw.

Of the eight cases reported from our clinic, all of the patients have been operated on within the last two and one-half years, so that the final results cannot be given. One patient died of heart-trouble eight months after the operation, and two have been operated on within the last six months. In one case the tumor recurred, but the patient has now been well more than two years; one recurred after two years and the patient has been reoperated on for the recurrence within the last six months. In one case, on account of the extensiveness of the tumor and the fact that the cyst had fibrous walls which involved the entire half of the jaw and the ramus and extended across the midline, resection was impossible. The tumor was opened and the cysts curetted. Several small cysts have appeared since the operation. Two patients have had no recurrence; one case is of eighteen months' standing and one of two years'.

ABSTRACT OF DISCUSSION

DR. F. B. MOOREHEAD, Chicago: The classification Dr. New suggests is not entirely satisfactory. Until we know more about their pathology, we are not likely to have a scientific classification of these jaw cysts. In the types which Dr. New classifies as Class A and Class B, the questions are whether one originates from embryonic remains and whether the other is due to irritants, as infection through tooth roots, etc. There is also a question of the histology of these two types of cysts, whether one contains an epithelial lining and the other does not. Some men believe that the cyst due to infection does not contain any epithelial cells, while the other type of cysts does. It is difficult to get a good specimen for examination from the infection type of cyst for two reasons: first, these cysts are usually the seat of a secondary infection, and the epithelial lining is frequently destroyed; secondly, the cyst-wall may be very thin and may be badly torn when removed, so that a good specimen is difficult to obtain. In an uncomplicated infection cyst we find a characteristic straw-colored stringy fluid, which contains cholesterin, showing that there has been cell degeneration. I am certain that these cysts, which are infective in origin, do contain epithelial cells, and that when one is fortunate enough to get a good section he will find a definite epithelial lining. From the clinical side, there are two things to be borne in mind in dealing with these cysts: first, they may encroach on the inferior dental nerve in the lower jaw, in the upper jaw on the maxillary sinus. The bone is destroyed in all these cases by pressure apathy. One, therefore, must bear in mind the fact that in operating on these cysts in the upper jaw, he is quite likely to get into the maxillary sinus, or even the nasal sinus, and also into the inferior dental canal in the lower jaw. In many cases the inferior dental nerve is entirely destroyed and analgesia of the tooth-supply of this branch may persist for a long period of time. In removing these cysts one should remove a sufficient amount of the external wall to restore the normal contour to the parts and no more. Whether there has been a bulging of the walls on either the upper or lower jaw, the wall should be removed down to a point where the normal contour is restored.

DR. T. L. GILMER, Chicago: A better classification of cysts of the jaw is desirable; still we should be a little slow in making radical changes until we know more of their pathology and also the histology of the elements which make up such cysts. The origin of dentigerous cysts is certainly quite different from that of the other class of cysts designated as infection cysts. Eve expressed the opinion that multilocular cysts were due to inclusion of the epiblast by the mesoblast. It seems reasonable to suppose that persistent embryonic epithelial remains of the enamel-organ cord may be stimulated by infection and cause it to proliferate, resulting in the so-called infection cysts which undoubtedly are associated with infected teeth. I am not sure that such cysts should be designated as infection cysts; they are caused by infection in the jaws about the roots of teeth, but are not necessarily infected at first, but may become so afterward. I have made microscopic examination of the lining of the walls of these cysts and found in some of them epithelial cells. In others, in which there has been much thinning of the walls of the

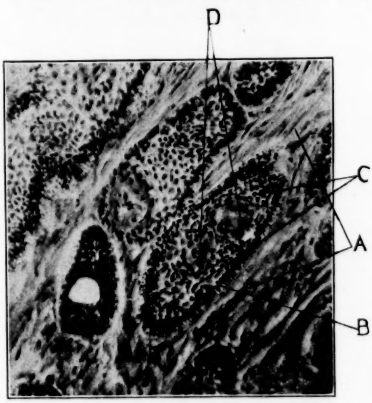

Fig. 9 (A 68435).—*A*, connective-tissue stroma; *B*, columnar epithelium; *C* and *D*, differential cells. *B*, *C* and *D* are analogous to the cells of the enamel-organs.

16. Bloodgood, J. C.: Bone Cysts, THE JOURNAL A. M. A., Oct. 15, 1904, p. 1124.

cyst from long standing, the epithelium is seemingly lost. Concerning the surgical treatment for cure in the cases spoken of by Dr. New, in which he recommended resection of the jaw, I believe that I can judge very certainly by a good view of the bone, whether I have gotten beyond the area involved. I doubt if we should ever make exsection of the mandible except in positively malignant growths involving the whole thickness of the mandible. If even a little bone can be left to support the jaw it will prevent the terrible disfigurement of the patient which results from complete

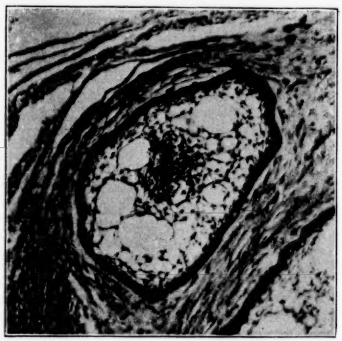

Fig. 10 (A 59772).—Adamantinoma. Early cyst formation by the disintegration of the differentiated cells.

separation of the jaw. If the case is carefully watched the more radical operation may be done if there is indication of recurrence. I feel that we are justified in this method except in the most malignant cases.

DR. M. I. SCHAMBERG, New York: I have two pictures, one showing enlargement of the mandible from the cuspid region back toward the ramus; the second showing a tremendous destruction of the jaw similar to that described by Dr. Moorehead. In this case we operated after the method condemned by Dr. Moorehead and the result can best be determined by the roentgenogram, which was made a year and a half after the operation and shows complete regeneration of the bone throughout its entire extent. These cases I have endeavored to follow up in every instance so as to know definitely the results obtained. The method of procedure was to make an incision along the upper border of the alveolar plate, after taking out the involved teeth. We allowed the third molar to remain as a possible abutment for bridgework later. After dissecting the mucous membrane away along the buccal side and cutting away a thin layer of the bone about the lower border so as to get access to the entire cystic cavity, the whole was removed *en masse* and by microscopic examination we found it contained epithelial cells. The cavity was then packed with iodoform gauze until the cavity filled with granulation tissue which has since been replaced by bone structure. That is the method that I employ in almost all of these cases.

In a case of multilocular cyst Dr. Jerrigan, the surgeon, contemplated exsection of the jaw. When I saw the patient I advocated the operation which I performed of making an incision along the lower border of the jaw, starting at the lobe of the ear and carrying it along the lower border to a certain point. This patient was a prominent man in his town, and felt that the loss of his jaw would prove a serious handicap, and I am sure that the recovery in this case will be as permanent and as satisfactory as in the other case. The roentgenograms are a most important step in the diagnosis and prognosis of the cases and as an aid in outlining the operation necessary.

DR. THEODORE BLUM, New York: With regard to operations for cysts, Dr. Schamberg did not mention that he is performing a special operation in the upper jaw. This operation is what is known as Jones' operation. In contrast to the other operations mentioned this does not involve the removal of the entire cyst wall but only its outer portion. Instead of opening and removing the cyst wall entirely and then allowing the wound to heal by granulation, only the major part of the outer wall of the cyst is removed. First, an incision is made, low instead of high, because it gives better access to the cavity. A good portion of the outer wall should be taken away so as to flatten out the cavity as much as possible. The teeth have been taken care of, the flap above and the one below are turned in and either retained by gauze packing or sutured at both points. It only takes three or four days for the mucous membrane of the mouth to unite, and we can discharge the patient with instructions as to cleaning the mouth with a syringe. This is a valuable operation in hospital work because the patient can be dismissed for weeks. This operation is frequently performed by Dr. Partsch of Germany, who is an authority on this subject. In the case of large cysts when there is danger of fracture, Dr. Partsch advises that, before operating, an appliance be put in the mouth consisting of a sliding joint, and in case of a subsequent fracture the fractured parts are held in place on each side of the jaw.

DR. C. K. TETER, Cleveland: In following up cases and operations, this is one of the most satisfactory operations we can accomplish because of the unlikelihood of recurrence. A few cases will bear out Dr. Schamberg's idea that the bone will regenerate on the lower jaw. In one case, in a young man 18 years of age with an enormous cyst on the right side of the maxilla which extended from the angle of the jaw to the lower border of the first bicuspid tooth, the cyst involved not only the third but also the second molar. An incision was made near the ridge of the jaw and it was comparatively easy to remove the outer wall of the cyst together with the fibrous socket which came out practically *en masse*. Eight months afterward a roentgenogram was taken and showed a practically reformed mandible, which was very gratifying to the patient as well as to me.

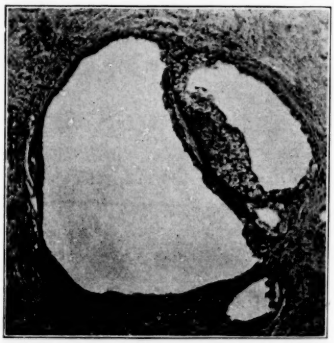

Fig. 11 (A 68435).—More advanced stage in formation of a cyst. Very few differentiated cells are left. The cyst is lined by a layer of columnar cells.

In another case a multilocular cyst in the region of the upper first and second bicuspid about the size of an English walnut, contained, besides fluid, twenty-four small pieces of illy formed cementum and enamel about the size of grains of rice.

Preventogram.—"Self protection is the first law of nature." The willingness to protect others, as well as self, separates human-kind from the brutes.—Pittsburgh *City's Health.*

MESOTHELIAL TUMORS OF THE JAWS*

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Within the past year it has been my privilege to study, clinically and histologically, a considerable variety of mesoblastic neoplasms of the oral cavity. Most of these cases occurred in the oral surgical service of Dr. M. H. Cryer, to whom I am indebted for the opportunity of reporting them.

Most of the growths under consideration fall into that group known under the common term "epulis," a name meaning from its derivation anything on the gum. An epulis may be described as a circumscribed connective-tissue growth from the alveolar ridge, which is covered over by the normal mucous membrane, except as the latter may undergo secondary ulceration due to pressure necrosis, infection, etc. (Occasionally, growths clinically classified as epulis may be found to be epithelial in nature, for example, papilloma, epithelioma, etc., but these will not be considered here.) Under this broad heading, therefore, many clinical and pathologic varieties of mesoblastic tumor may be included.

The most obvious clinical characteristics of an epulis and those which give the most reliable information as to its pathologic nature are (a) consistency, and (b) rate of growth. Thus we have the hard epulis and the soft epulis. The hardness is in the new tissue itself. In the soft variety there may be a hard shell of bone covering a portion of the tumor, but the tumor tissue itself is soft. The hard variety of epulis is nearly always very slow in growth, and alters in size but little in months or even years. There is usually quite a sudden line of demarcation where the bulging of the new growth extends beyond the normal contour of the gum. It gives the impression of arising from the surface of the underlying alveolar process. In color, the gum tissue covering the tumor may be slightly reddened, though it generally differs but little from that of the normal gum.

Fig. 1.—Roentgenogram showing giant-cell myeloma. (Cryer.)

The soft form of epulis on the other hand, is usually rapid in growth, often increasing greatly in size in a few weeks. The bulging beyond the normal gum-contour, in the deeper parts of the swelling at least, generally occurs gradually while one may distinctly recognize the origin of the growth as being from the interior of the bone. A portion of the tumor may be covered by a bulging shell of bone. In color, these tumors are generally a dusky red. In this variety of neoplasm, the Roentgen ray frequently shows a space in the bone as clean-cut as though it had been drilled through with a large caliber bullet (Fig. 1). Epulic growths may be sessile or slightly pedunculated, and vary in size, occupying the space of one, two, or several teeth, which are often considerably displaced or loosened.

The two clinical types of epulic tumor present marked differences in histologic appearance.

The hard variety of epulis is fibroma pure and simple. Microscopically, we see an outer layer of normal stratified squamous epithelium and submucosa, while the deeper portion of the growth consists of an interlacing network of fibrous tissue (Fig. 2). Occasionally there is evidence of myxomatous degeneration, and sometimes of bone formation. These growths spring from the periosteum lining the alveoli.

The soft epulic tumors are generally grouped pathologically under the giant-cell sarcomas or myelomas. Histologically, beneath the covering mucous membrane there is a stroma of fibrocellular tissue resembling fibrosarcoma. Scattered throughout are the giant-cells, which vary in size and have numerous nuclei grouped toward the center of the cell. Small masses of bone and cartilage may be found (Fig. 2).

There is considerable confusion as to the proper classification of these growths, the literature both surgical and pathologic presenting many divergent views. Thus Bland-Sutton[1] terms the growth a "myeloma or red-marrow tumor." Nichols[2] regards it as a "bone-marrow or medullary sarcoma." Owen[3] describes the same thing as "myeloid sarcoma." Other writers prefer to use the term "myeloma" rather than giant-cell sarcoma. The confusion is further increased by finding in works on pathology an entirely different growth described as myeloma, which contains no giant-cells whatever. Thus Mallory[4] describes the myeloma as a "tumor which arises within the bone-marrow and which is peculiarly characterized by causing the presence of albumose in the urine. . . . The cells are of medium size and irregularly spherical." Nowhere does he mention the presence of giant-cells in this growth. Mallory[5] further says that the term "giant-cell sarcoma" should be abolished. He states that at least two types of giant-cells are found in tumors, one resulting from multiple mitosis and signifying rapid growth, and the second, which is found most commonly in new growth involving bone. It is the latter type that is most frequently met in these giant-cell tumors of the jaws. Mallory looks on them as "foreign-body giant-cells, similar to the osteoclasts of normal bone, and are due to the fusion of endothelial leukocytes attracted into the tumor by the

* Read before the Section on Stomatology at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

1. Bland-Sutton: Keen's Surgery, i, 747.
2. Nichols: Keen's Surgery, ii, 69 and 70.
3. Owen: Keen's Surgery, iii, 643.
4. Mallory: Pathologic Histology, p. 338.
5. Mallory: Pathologic Histology, p. 273.

presence chiefly of lime salts which they dissolve and remove. They signify usually disintegration of bone. . . . The tumor containing foreign-body giant-cells should be classified according to the nature of the other cells present in the tumor; the foreign-body giant-cells should be disregarded. They do not signify either rapid growth or malignancy." From clinical observation of cases showing these giant-cells, we agree with Mallory that they signify neither rapid growth nor malignancy, but would go still further and say that their presence rather tends to show that the tumor is non-malignant in most cases. For we have seen several cases, which, if the giant-cells were excluded, from the histologic appearance of the remaining tissue would have to be classified as malignant sarcomas, and yet in which simple removal of the growth itself has resulted in perfect cure. The presence of giant-cells would therefore seem to be an indication that the malignancy of the tissue has been modified in some manner, and that they thus have considerable significance from the point of view of prognosis. It is unfortunate that there is no suitable name, agreed on by all, for this frequently occurring growth.

There is, however, a tumor of the jaw rich in foreign-body giant-cells, which cannot be regarded as clinically benign. This type has recently been described for the first time by Whitman.[6] In the new type there is a proliferation of the vascular endothelial cells which extend to form the main elements of the tumor. Scattered throughout are numerous foreign-body giant-cells, a great many of which lie within the lumina of blood-vessels. Whitman concludes that myeloid or giant-cell sarcomas can be divided into two groups, the new group consisting of tumors very closely resembling the true myeloid sarcoma (that is, the form first described), but which are clearly of endothelial origin and the giant-cells of which are usually intravascular.

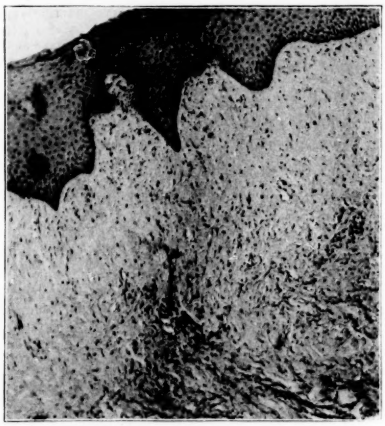

Fig. 2.—Histologic appearance of section from fibrous epulis. Note interlacing network of fibrous tissue.

We believe that the recognition of two distinct types of giant-cell myeloma is not only of pathologic interest, but is also of considerable clinical importance. I think we have all had the experience of cases in which a pathologic report of giant-cell sarcoma was rendered, and yet which pursued quite divergent clinical courses subsequently, in one case simple removal resulting in cure, in another followed by recurrence of the growth. From a study of our cases and comparison with that reported by Whitman, I believe that this clinical difference is due to difference in structure. Ordinarily, giant-cell tumors of the jaws are not to be regarded as clinically malignant, that is, they are sharply defined from the surrounding healthy tissue and shell out easily from the cavity in the bone. They produce no metastases, and do not recur after simple enucleation. Histologically and clinically, four of the cases of giant-cell tumor to be reported were of the usual type (Cases 2, 3, 4 and 5). The other case (Case 6) corresponds closely to the new type described by Whitman, and in its clinical manifestations differed markedly from those belonging to the usual form. There was an extensive growth of the upper jaw, involving the maxillary sinus, not sharply circumscribed, and which recurred several times after apparently complete excision. Microscopically (Figs. 4 and 5), the growth consisted of a proliferation of the capillary endothelial cells to form the stroma of the tumor, and numerous spaces, evidently dilated capillaries, which contained foreign-body giant-cells similar in appearance to those of the ordinary type of tumor. Whitman's case appears to be clinically similar to ours, as he states that it recurred twice after operation. These two cases, having similar clinical and histologic characteristics, form evidence that we are dealing here with a more malignant form of growth than the ordinary type of giant-cell tumor, requiring more extensive operation to ensure cure.

The unfortunate application of the term "sarcoma" to the ordinary giant-cell tumors of the jaws has led to much ruthless and unnecessary sacrifice of tissue in a part of the body in which a consideration of cosmetic results is secondary only to the life of the patient. There is no advantage in opening the face or excising half the jaw for the removal of these tumors when it is perfectly safe simply to shell out the growth from within the mouth without fear of recurrence. In the second or endothelial type, however, a more extensive operation is usually required. The nature of the growth can generally be recognized at operation, but if not, histologic examination will indicate whether or not further excision will be necessary.

6. Whitman: Jour. Med. Research, January, 1914, p. 465.

REPORT OF CASES

CASE 1.—C. N., aged 37, was seen Jan. 5, 1914, with a growth on the gum of the lower jaw that he said had been there for sixteen years. It was slowly growing larger, but caused no pain. Examination showed a hard nodular swelling in the alveolar region of the lower jaw, extending from the left first premolar to the right lateral incisor tooth, several of the intervening teeth being displaced or loosened. Diagnosis: fibrous epulis. Operation consisted in extraction of teeth involved, and excision of growth and alveolar process from which it arose. Uneventful healing ensued. Histologic examination shows growth to be a fibroma (Fig. 2). There was slight evidence of myxomatous degeneration.

CASE 2.—A. P., woman, aged 52. Patient first seen March 14, 1913. She had had no upper teeth for twenty years or more and wears a full set of artificial teeth. For at least ten years she has had a swelling on the right side of the upper jaw which never caused any pain, but is gradually growing larger and interferes with the fit of her plate. On the right side of the maxilla in the region of the alveolar

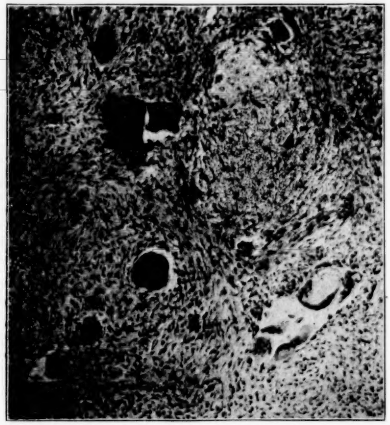

Fig. 3.—Histologic appearance of section from giant-cell myeloma, common type. Small masses of bone and cartilage seen.

ridge there was a smooth soft dark-red growth, about 1 inch long by ½ inch wide. The tumor was excised by Dr. M. H. Cryer, without any attempt at removal of the surrounding healthy tissue. Healing occurred in due course without any recurrence or other complications. Microscopic examination showed a covering of squamous epithelium, while the interior of the growth consisted of a fibrocellular stroma containing many foreign-body giant-cells (Fig. 3). Diagnosis: Giant-cell myeloma, benign type.

CASE 3.—M. W., woman, aged 22. Patient first seen Sept. 18, 1913, in association with Dr. R. H. D. Swing. For about three months she had noticed a gradually increasing painless swelling of the left side of the lower jaw, which caused displacement of teeth. Examination showed a smooth swelling of the gum on the left side of mandible extending from the first molar to the canine tooth. The teeth involved were sound but the premolars were somewhat displaced. The growth caused the internal and external alveolar plates to bulge, forming a thin shell of bone over it. The two premolar and canine teeth were removed together with their alveolar process and soft dark-red material was curetted out from the thin shell of the bone forming the body of the jaw at this point. The continuity of the bone was preserved. Slow but uneventful recovery ensued, and no signs of recurrence appeared after nine months. Several small masses of gritty material were scattered throughout the soft tissue, which proved to be small areas of bone and cartilage on microscopic examination. In other respects the tissue was similar to that found in Case 2. Diagnosis: Giant-cell myeloma, of benign type.

CASE 4.—J. F., boy, aged 17. First seen Jan. 10, 1914. Patient stated that for about six weeks he had noticed, slightly to the left of the median line, a painless swelling of the lower jaw, which was increasing in size. Examination showed a spongy, non-tender growth, extending from the symphysis to the left first premolar. The growth extended upward about the necks of the teeth and below caused a bulging of the alveolar plates. The teeth were irregularly displaced by the tumor. The roentgenogram (Fig. 1) showed a light area in the alveolar process and body of the bone in the position corresponding to the growth. The operation by Dr. M. H. Cryer consisted of the removal of the teeth—from the right central incisor to the left first premolar—together with their alveolar process, and the shelling out of a mass of soft dark-red jelly-like material from the deeper portion of the bone. This tissue lay in a smooth cavity in the bone extending almost to the lower edge of the mandible, and appeared to be separated from the healthy bone by a sort of fibrous capsule. The cavity in the bone is slowly filling up, with no sign of recurrence of the growth. The tissue was histologically similar to that found in the two preceding cases. The outer portion of the tumor consisted of a condensation of the fibrocellular tissue, containing no giant-cells in this situation. Diagnosis: Giant-cell myeloma, benign type (Fig. 3).

CASE 5.—R. D., boy, aged 9. Patient came to the clinic March 17, 1914, on account of a growth on the right side of the upper jaw. This growth had been noticed for about six months, and had been partially excised two or three times by a dentist, who took it for a simple hypertrophy of the gum caused by the irritation from decayed teeth. The growth was gradually increasing in size, but never caused any pain. Examination showed a dark-red, soft lobulated mass projecting from the right upper alveolar process at a position corresponding to the premolar teeth. The temporary molar teeth at this position had been lost, while the premolars were only partially erupted and covered by the growth. Operation March 20 by Dr. Cryer consisted in excision of the tumor, extraction of the two premolar teeth, and slight curetting of the underlying alveolar process. Uneventful recovery followed. Microscopic examination showed the tumor to be a giant-cell myeloma of the benign type.

CASE 6.—W. T., man, aged 29. Patient was first seen Dec. 2, 1913, with a swelling of the right side of the upper jaw that he had noticed for about six months. He complained of practically no pain, but several teeth had loosened and been lost. Examination showed a dark-red enlargement of the right side of the upper jaw extending from the region

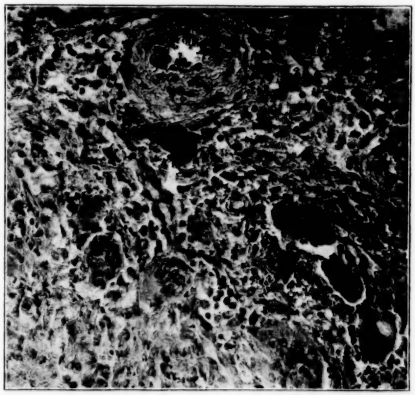

Fig. 4.—Section from giant-cell myeloma, endothelial type, showing proliferation of endothelial cells.

of the canine to the second molar tooth. The growth was smooth, was not confined to the alveolar process, but caused a bulging over the hard palate almost to the median line. Operation by Dr. Cryer consisted in removal of the growth and bone from which it arose, through the mouth without opening the face. The tumor was found to extend into the maxillary sinus, which was curetted and packed. Micro-

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scopically the tumor was found to be a giant-cell endothelioma (Fig. 4) similar to that described by Whitman (see above). Feb. 23, 1914, a second operation became necessary owing to recurrence in the maxillary sinus and toward the median line of the palate. This was also performed without opening the face, a considerable portion of the palatal process of the maxilla being cut away, so that an opening was made in the hard palate between the mouth and the nose. Two weeks later a third small operation became necessary owing to a slight recurrence in the region of the maxillary tuberosity. At present the patient is apparently cured, and a prosthetic appliance will be made to close the defect in the palate caused by the operation.

SUMMARY

1. Epulic tumors may be classified as hard or fibrous, and soft or giant-cell.

2. The giant-cell tumors of the jaw bones fall into the two distinct classes: (*a*) the ordinary so-called giant-cell or myeloid sarcoma; (*b*) the giant-cell endothelioma, recently described by Whitman.

3. Tumors belonging to Type *a* have all the clinical characteristics of and may be regarded as benign tumors, and require only local removal of the new growth itself as in the case of other benign growths.

4. Tumors belonging to Type *b* are more malignant and should be treated accordingly by more extensive operation.

1623 Walnut Street.

Fig. 5.—Section from giant-cell myeloma, endothelial type.

ABSTRACT OF DISCUSSION

DR. R. P. BAY, Baltimore: I shall, in speaking of endothelial tumors, consider them not as epuli of the mouth, but as sarcomas. Some authors classify these tumors of the epulis variety as benign tumors which are histologically malignant; in other words, a sarcoma which is histologically malignant and yet benign clinically. As Dr. Ivy said, some cases of epulis and sarcoma around the gum are benign and some malignant; some shell out easily without much disfigurement or difficulty. In my experience it is impossible to apply any hard and fast rule in these cases. We consider, and probably we are right, that the older the individual the better the prognosis in cases of sarcoma occurring around the mouth, the same as we have in epithelioma and carcinoma. I have seen cases of sarcoma or epulis, and we may even see endothelial tumors occur practically at all ages from the infant to the advanced age of 68. We know absolutely nothing, so far as I know, of the cause of sarcoma or mesothelial tumors. It was once thought they were congenital. The most rapidly growing and the mostt advanced case I have had under observation was a case of giant-cell sarcoma which the pathologist thought was a typical simple epulis, occurring in a child 10 years of age. It was removed by methods that would be accepted as probably more extensive than ordinarily required, but it recurred very rapidly and in six or eight months a complete resection of the jaw was necessary. That was, according to our knowledge of the pathology of these cases, the variety that shells out very easily, though this case was a typical case of giant-cell sarcoma. The epulis occurring in old people usually starts from some irritation. They practically always start, I believe, from the periosteum coming out directly from between the teeth. It is useless to shell out these epuli without removing at least one or two teeth, or at least the tooth they are attached to. I assert that those who are teaching oral surgery and who come in contact with students, should advocate the complete and early removal of tumors and lumps of whatever character occurring around the gum. They can be, of course, innocent, and possibly the majority are, but they certainly can be as malignant or more so than any with which we have to deal. So that we should advocate the early removal of all growths coming from around the gum when the periosteum is injured or from some other cause. I believe also that after we remove the growth with the knife, the tissues should be cauterized with the electric cautery.

DR. VIRGIL LOEB, St. Louis: How does Dr. Ivy classify the epuli which he calls typical angio-epithelioma?

DR. M. I. SCHAMBERG, New York: We frequently hear of radical operations being performed for so-called malignant growths about the mouth, and it has been my experience that these giant-cell sarcomas are in a measure inflammatory growths; they really assume the form of inflammatory tissue. In fact Dr. Bloodgood of Johns Hopkins has expressed a similar opinion with regard to the giant-cell variety of sarcoma. For that reason I am sorry that Dr. Ivy did not take up the subject from the etiologic point of view. These sarcomas are usually completely cured by simple removal. My experience conforms with that of those who have encountered these cases. I have run across few cases of giant-cell sarcoma that involved the maxillary sinus and which required further operation. I recently operated on one which appeared to involve the anterior wall of the antrum and caused the face to be quite prominent as high as the inner canthus of the eye, and after the operation there was quite a bit of surgical traumatic thickening of the periosteum which led me to believe I was going to have a recurrence. In that particular case the patient had been wearing some unhygenic bridgework in the mouth, with a cuspid tooth involved which I thought was the cause of this growth. After the removal of the tooth and the surrounding tissues by means of the curet followed by cauterization and packing the wound, the condition has completely subsided. Another feature of that case which led me to believe that it was largely inflammatory in origin, though under the microscope it showed the typical appearance of the giant-cell sarcoma, was that there were periodic swellings of the eye, with edema after the operation, which would give a clinical appearance of inflammatory growth. I believe, with Dr. Bloodgood, that these cases are of possible inflammatory origin and that these giant cells occur as the result of some form of chronic irritation. We know, too, that the true epulic growths occurring in and about the mouth, that spring from the periosteum, are inflammatory in origin, and are either produced by irritation of the teeth or by motion between two closely approximating teeth. The etiology of these growths is of great importance as it tends to bear out the clinical findings. I might also refer to a multilocular cyst of the jaw which was extensive, extending into the neck of the condyle of the jaw and in which almost the entire half of the jaw was involved, which I operated on some years ago, which under the microscope was thought to be malignant, but clinically the case ran a benign course. It became a very extensive growth with

no involvement of the adjacent lymphatic glands, nor has there been any systemic effect, though the growth had assumed large proportions. In that case there has been almost complete regeneration of the side of the jaw and ramus.

DR. F. B. MOOREHEAD, Chicago: Histogenetically, there are three distinct varieties of fibroma found in the mouth—from the gum, from the periosteum and from the peridental membrane. The difficult feature is to determine the parent cell and be guided entirely by that in the removal of these growths. There are some sharply defined clinical characteristics that will lead to a conclusion as to whether they come from connective tissue in the gum, in the peridental membrane or in the periosteum. It is perfectly obvious that, if the fibroma has originated in the peridental membrane, the simple enucleation, so-called, is going to fail and the removal of the tooth in that case is always indicated. If, on the other hand, it originates in the periosteum, then an incision down to and including the periosteum is all that is necessary. This is an important point. One striking thing about this whole mesothelial group is that the malignancy has a definite relation to the size of the element. The smaller the element, the more malignant, and when we have the small round-cell type it is an extremely malignant form. Some run a benign course throughout, while others are malignant from the beginning. Others begin as benign tumors and later degenerate into malignant tumors. We should look with suspicion, therefore, on all connective-tissue growths found in the mouth. I wish we might get away from the term "epulis." It means nothing and is frequently misleading.

DR. C. K. TETER, Cleveland: One important point is the accuracy of the report from the pathologist. Anybody doing much of this work gets into deep water sometimes if he accepts the report of the pathologist as final and carries out his work along that line, as two cases I will speak of will show. One case which occurred about eight years ago was that of a small tumor on the side of the upper jaw, located near the upper third molar, and which turned out to be a fibroma. After the tumor was taken out, which was easily done, it was sent to the pathologist and the report came back to me that it was a giant-cell sarcoma. I felt it my duty to notify these people and to tell them that a far more radical operation should be done. They did not see fit to have the operation, and eight years have elapsed without a recurrence. That family has been quite indignant with me because I suggested a radical operation. Two years ago, I had an old gentleman over 80, who had a growth in his upper jaw which entirely filled the antrum and which shelled out easily. It was a spongy growth. I sent it to the pathologist and the report came back to me that it was a simple papilloma. I did not think anything further was necessary if that was the case, as the tumor came out practically intact. This man died from a sarcoma in about three months. I simply call attention to the fact that it is important to have an accurate pathologic examination.

DR. T. L. GILMER, Chicago: I would second Dr. Moorehead's remarks relative to the name, epulis. It is misleading and conveys a wrong impression, since the growths under consideration do not spring from the gum, as would be indicated by the name. I believe, with Dr. Schamberg, that the so-called epulis arises from irritations in most instances. If we examine the teeth closely, which these tumors approximate, a bit of calculus or a sharp edge on a broken or decayed tooth or root is generally found, or there are pockets about the teeth in which food or other debris has lodged. Those growths, sometimes called epulis, originating within the bone, are of a different origin and are more likely to be malignant. I have noticed that the tumors under discussion are malignant in proportion as they grow rapidly or slowly, those growing the most rapidly being the most malignant. Tumors of slow growth having the appearance of a fibroma, are most likely to be, histologically, giant-cell sarcomas. If they grow quickly and are soft and more vascular, they are more likely a different type of sarcoma, that is of the spindle or round-cell variety and are always malignant, while the giant-cell type is not usually so. With regard to radical operations for the removal of these growths, I read a paper some years ago in this section relative to radical operations for removal of tumors of the mandible. My belief was, and still is, that unless there is positive evidence microscopically that a tumor of the mandible is a rapidly growing malignant growth, a less radical operation should be first done and the case watched, rather than to sacrifice a large section of the jaw, which in the past has been done too frequently. I would not, however, simply snip off the growth, I would cut away all bone up to what appears to be immune area.

DR. JOHN S. MARSHALL, Berkeley, Cal.: I have been much edified by the discussion of this subject. I remember when a paper of this character would have fallen flat before a dental society; it would not have been discussed at all because nobody would have been capable of discussing it, but now more than half a dozen young men are capable of discussing this question in all of its aspects. This is particularly gratifying to me because I feel that I have had some little part in stimulating the young men to take up the subject of oral surgery. In my teaching work I have endeavored to impress on the minds of the young dentists in my classes that this was their particular field and should not be turned over to the general surgeon. Most of our young men have been afraid to tackle these cases, largely because the schools do not give the proper training in anatomy, histology, pathology and histopathology. The schools, however, have improved very much in that line in the last few years, and I am greatly pleased to see so much interest taken in this subject in this society, because it has been the pet subject of my professional life. When I first started out to study oral surgery, thirty-five years ago, about the only man who was doing anything was Dr. Garretson of Philadelphia, who, by the way, was the Nestor of oral surgery in this country. He said, in his talk on tumors, "If you cannot easily explain the character of a tumor as being positively malignant, treat it as a malignant tumor anyway and remove it," and that has been my practice. I do not temporize with them. If I cannot explain their character, I treat them as malignant and take them out, and I know positively that I have saved many lives by doing this. The application of irritants to a carcinoma or epithelioma is much like touching a match to the material of a bonfire—they go very quickly. There is nothing that will eradicate them so well and so surely as the knife, provided the operation is made before the glandular structures have become involved.

DR. R. H. IVY, Philadelphia: With regard to the etiology of these tumors, I have seen cases in which there was no indication of any inflammation or irritation, and others, on the other hand, which presented marked signs of inflammatory irritation, so that we cannot say definitely that these growths are stimulated by inflammatory conditions. In speaking of "shelling out" the tumors in treatment, I do not mean to avoid extracting teeth or removing bone from which the tumors may spring; I mean to extract the teeth involved, then simply enucleate the tumor itself, taking away as little of the good bone as possible. Again, I think we can generally diagnose the variety of the tumor by whether it is hard or soft. The great majority of fibromas are hard, while the giant-cell tumors are usually soft. Cases of fibroma may be found in mouths that are in a filthy condition, and I have seen the soft variety of epulis in clean mouths. In the pathologic diagnosis of these cases I believe that the surgeon or somebody connected with his clinic should follow them to the laboratory and confer with the pathologist. In that way I think there will be few mistakes and we will have few conflicting reports from the laboratory. With regard to the term angioma, in classifying tumors, it depends on the amount of vascular tissue found in them. If we find a fibroma which contains a large amount of vascular tissue we might call it an angiofibroma.

Exact Observation the Physician's Prime Essential.—There is one quality the possession of which is the supreme need of the physician, without which he is as unfit and useless as a tone-deaf musician or a color-blind painter; that is, the faculty of exact observation.—Minot.

THE RADICAL REMOVAL OF THE VERUMONTANUM

WITH NOTES ON PATHOLOGY*

A. G. RYTINA, A.B., M.D.
BALTIMORE

Since the advent of urethroscopy, diseases of the verumontanum have been of interest to the genito-urinary specialist, and a large and varied number of sexual, urinary and reflex disturbances have been described as caused by pathologic conditions in this organ. As far back as 1879, we find Grünfeldt, in the first book which appeared on urethroscopy, devoting a large chapter to diseases of the verumontanum, and discussing methods of therapy. In 1882 we find Burckhardt recommending the employment of silver nitrate and the thermocautery in combating affections of this organ. Following the appearance of these articles, we find in the literature quite a few dissertations dealing with this subject, but nothing of material advance has been made, unless it be the suggestion of some of our American authors, that perineal section and curettage of the verumontanum be employed in those cases that do not respond to the application of silver nitrate, the thermocautery, etc.

As the histology and pathology of the verumonatanum has been almost an entirely neglected field, the therapeutic results obtained are based only on empiricism, and therefore liable to error. That clinical improvement often follows applications to this organ cannot be gainsaid, yet it has never been accurately determined whether the improvement is due to a psychic influence, to a specific action on the verumontanum or to the general effect on the whole posterior urethra. That many authorities believe that the favorable action is due to the application to the verumontanum itself is indicated by their dictum that the application be strictly confined to this organ. On account of the lack of scientific proof, I have never been firmly convinced of the important rôle of the diseased verumontanum in causing so many untoward symptoms, and have been surprised that such sequelae as cicatricial obliteration of the ejaculatory ducts, with resulting sterility or painful ejaculation, have not been of more frequent occurrence after the use of the thermocautery or repeated applications of strong silver nitrate. Furthermore, other complications, such as urethritis, cystitis, prostatic abscess, severe urethral hemorrhage with retention of urine, epididymitis, as well as the painfulness of the applications and the necessity of repetitions in most cases, have led me to attempt an improvement on the present mode of therapy. By means of a technic to be described presently, the verumontanum can be removed with much less risk of the complications or sequelae described above and with much less pain and reactive symptoms that ordinarily follow a silver nitrate application. Furthermore, the operation is radical, and in allowing the removal of the almost intact verumontanum, enables us to make accurate pathologic studies, with the result that a more rational interpretation of the symptomatology and therapy may be anticipated. Of course, the operation should be carried out only in selected cases.

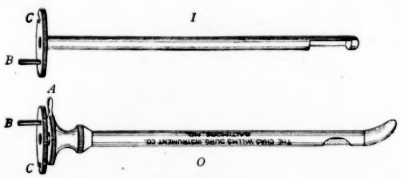

Fig. 1.—Endoscope.

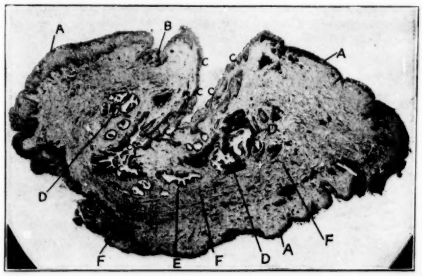

Fig. 2.—Section of normal verumontanum showing course and structure of sinus pocularis: *a*, mucous membrane; *b*, pit formation; *c*, sinus pocularis; *d*, central group of glands, some showing infoldings; *e*, duct; *f*, capsule; *g*, stroma.

DESCRIPTION OF TECHNIC OF OPERATION

The instrument is composed of two parts, *O* and *I* (Fig. 1). *O* is nothing but an ordinary curved posterior endoscope, having a large window on the convex surface near the beginning of the beak. The caliber is 28 F. *I* is a straight hollow tube which is also fenestrated. The edges of the latter are made of steel and well sharpened, the latter being an important particular. When *I* is introduced into *O* and the two guide-posts *A* and *B* are at right angles, the instrument is closed and *I* acts as an obturator. The instrument is introduced in the posterior urethra and *I* is rotated 180 degrees, or until the groove *C* fits into *A*. The instrument is now open. An ordinary Young's endoscopic light is now attached and the verumontanum located by pushing the instrument in or out, as the case may be. The structure is recognized by its shape, color and particularly by the opening of the sinus pocularis. In some cases it requires a little experience before one can differentiate between the verumontanum and the mucous membrane bulging in the lumen of the instrument. An application of epinephrin and cocain may now be applied, but this is not absolutely necessary. The light is now detached and the instrument rotated slightly to the patient's right, the ocular end elevated and held firmly. *I* is now rotated from the 6 o'clock aspect from left to right, stopping at a point a little beyond the 12 o'clock aspect. By rotating the instrument in the direction indicated, the knife-blade first encircles the verumontanum and only begins to cut when it reaches about the 11:30 o'clock aspect. The successful excision is indicated by a sense of slight

* From the Departments of Genito-Urinary Surgery of the College of Physicians and Surgeons and the Johns Hopkins Hospital.

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resistance imparted to the finger. Following the excision, the inner tube containing the verumontanum is withdrawn and an application of cocain and epinephrin is made through the outer tube, although I have lately discarded the latter procedure. If desired, the entire instrument can be at once removed. However, one should be certain that the cut has been clean and no mucous membrane attached by rotating the instrument. The patient is then put on hexamethylenamin for a few days. Verumontana that are adherent to the urethral walls, or that are highly edematous, may slip out of the window during the process of rotation. This difficulty can be lessened by introducing a finger into the rectum between the two lobes of the prostate and in that way aid in making less mobile the verumontanum and posterior urethra. The pain following the operation is less than follows a strong silver nitrate application and the hemorrhage is never alarming, and ceases in a few minutes.

Reactive symptoms, such as pain and hematuria, disappear in from twenty-four to forty-eight hours. We have tried this operation about eighteen times and the only complication we have had, has been one case of acute epididymitis. We have satisfied ourselves of the patency of the ejaculatory ducts by demonstrating spermatozoa in the semen. Colliculectomy does not affect the patient's sexual appetite. Following the removal of the verumontanum, endoscopy of the posterior urethra shows a slight elevation of the mucous membrane in the position of the former verumontanum and one or both ejaculatory ducts are in most cases visible.

I am not prepared at this time to speak of the clinical value of the operation, but prefer to discuss the anatomy, histology and pathology of the verumontanum, which the excisions afforded me. Suffice to say that unless the therapeutic results are due to a specific action of the measures employed, or the general action on the whole posterior urethra, the operation must at least emulate, if it does not excel them. I am free to confess, however, my belief that the beneficent results in many cases are due in no small measure to the coincident action on the whole posterior urethra, a view which is not shared by most observers.

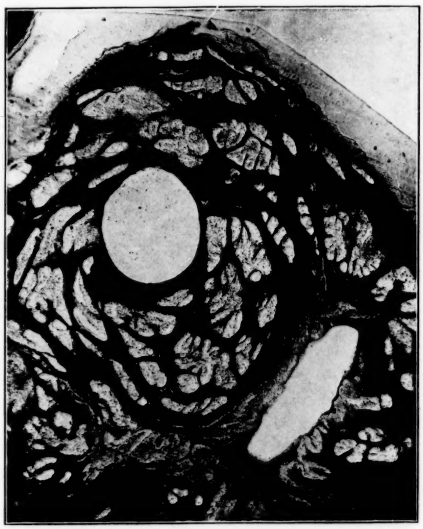

Fig. 3.—Section of verumontanum showing elastic tissue formation. Photograph includes central glandular portion and only small part of stroma portion. Darkened areas represent elastic tissue. Note how it enters into formation of walls of acini and the stalks of the infolding processes.

ANATOMY

I have examined a large number of text-books on embryology, histology, anatomy, pathology and genito-urinary surgery and it is surprising what a dearth there is on the subject of the verumontanum. Practically all repeat that the verumontanum is a rounded elevation situated on the floor of the posterior urethra, having opening on its lower front walls the ejaculatory ducts and on its upper anterior surface the sinus pocularis. Some erroneously assert that the ejaculatory ducts always open in the sinus pocularis. The latter in man is a rare occurrence. Nowhere have I seen its histology described in detail. This I propose to do. The gross appearance of the verumontanum shows the color a pale pink, lighter in hue than the surrounding mucous membrane of the urethra. It is rounded or oval in shape, excepting the base, which is more flat. The sinus pocularis may be represented by a small rounded opening or as a mere slit. The ejaculatory ducts are difficult to see. Its consistence is fairly firm and judged from the surface, would seem to be more or less homogeneous, but on examining the base, a truer knowledge of its structure is at once evident. Here one notes that the verumontanum is composed of two distinct structures separated by a dense, pearly-white, circular capsule. The inner or central portion comprises about one-fourth to one-third the whole, has a yellowish color, a loose, spongy, lobulated character and projects over the rest of the base of the organ. In its immediate center is a minute aperture. A fine wire or probe is easily admitted, extends through and comes out at the opening of the sinus pocularis above. The outer or peripheral portion comprises about two-thirds or three-fourths of the whole, is grayish pink in color, its texture fine, close and more or less homogeneous.

HISTOLOGY

The microscope readily enables us to differentiate the verumontanum into a central glandular portion and a peripheral stromal portion. The surface is covered by a many-layered, stratified, squamous epithelium, similar to that seen on the surface mucous membrane of the posterior urethra. Below this, one sees a layer of subepithelial connective tissue stroma. Deeper down in the central portion, one encounters groups of glands which show numerous intra-acinous proliferations. These infoldings are composed generally of several layers of epithelial cells, which may be of the simple cuboidal, columnar or squamous type. At times one can see the infoldings of a stratified type in one portion of the acinus while another will exhibit the cells composed of a simple, cuboidal epithelium. At times the infoldings are composed of a solid mass of epithelial cells. More often one can see a fine supporting stalk. Many of the acini seem to be dilated. No corpora amylacea are seen and the lumen of the glands

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seems to be empty. The outer, or the peripheral portion, is composed largely of normal-looking fibrous tissue stroma containing here and there an occasional glandular acinus, which may show the same infoldings already described. Several observers have removed polypi from the verumontanum, which had the same microscopic appearance as the foregoing and which they termed "glandular polypi." It is possible that they were describing the verumontanum itself. The capsule is composed of dense, circular bands of fibrous and elastic tissue. By special staining methods, we were able to show that the verumontanum both in the glandular and stroma portions, contains much elastic tissue (Fig. 3). This, however, varies in the different specimens. It is arranged in long wavy strands, and is fairly rich in the capsular portion. From here, one can see it extending into and forming part of the intra-acinous stroma, the walls of the acini and the stalks of the infoldings. Fibrous tissue, of course, is the predominating stromal element. The verumontanum is poor in involuntary muscle fibers, not especially rich in nerves, but plentifully supplied with blood-vessels and lymphatics. This microscopic picture somewhat resembles prostatic hypertrophy. The differentiation is made by the fewer acini, the lessened dilation and the lessened infoldings of the acini and the greater amount of intra-acinous stroma seen in the verumontanum.

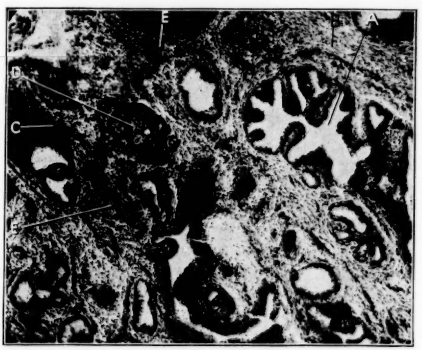

Fig. 4.—Section through an infected verumontanum. Infection is limited to left half; right half is normal: *a*, normal acinus showing infoldings, suggests prostatic hypertrophy; *b*, normal stroma; *c*, peri-acinous infiltration with round cells; *d*, normal acinus replaced by round-cell infiltration; *e*, infected stroma.

SINUS POCULARIS

Most text-books simply describe the sinus pocularis as a rounded or slit-like opening on the anterior summit of the verumontanum. Burckhardt mentions that it courses through the verumontanum and then blindly ends in the substance of the prostate. It is developed from the lowermost ends of the mullerian ducts and is therefore analogous to the female uterus and vagina, on which account it has been called the uterinus masculinus. Our studies show that the sinus pocularis (Fig. 2) is a long canal lined by a many-layered squamous epithelium, and by serial sections we have been able to demonstrate that it ends by a complicated system of invagination processes. They are also lined by the same type of epithelium and suggest glandular organs, but are probably only secreting surfaces. It is easy to see how favorable this structure is for retention products and suggests difficulty in eradicating infection. Surrounding the sinus pocularis are the central group of glands already described.

PATHOLOGY

The only type of pathologic verumontanum that we have been able to study thus far has been that due to infection. We have had several such cases, but they nearly all show the same picture (Fig. 4), namely, a submucous and a periacinous infiltration of round cells, among which one can see an occasional pus-cell. In some places round-cell infiltration may be so marked that it will completely replace the position of a former acinus. At times one can see in the interior of the acinus round-cells, pus-cells or desquamated epithelial cells. Occasionally red blood-cells may be seen, the result of trauma. We have sections which show infection traveling down the length of the sinus pocularis into the invaginations below, showing the necessity of injecting the canal, as first suggested by Luys and later independently by Geraghty. Indeed, we believe that researches that we are now carrying out will show that the sinus pocularis is often the most important factor in keeping up infection in the verumontanum and that the surface appearance of the latter indicates the pathologic condition in the utricle below, as an ulcerated ureter mouth reflects kidney tuberculosis above. Let me cite a case to illustrate this point:

W. S., complaining many months on account of frequent nocturnal emissions: Endoscopy shows a highly inflamed verumontanum covered by many granulations. Several applications of caustic to the verumontanum brought no relief in symptoms or improvement in the appearance of the organ. Once following mere endoscopy and another time after the application of caustic, patient had severe urethrorrhagia with retention of urine. During endoscopy, March 30, 1914, the edge of the tube was pressed against the verumontanum and a drop of thick pus exuded from the utricle. Injections by means of Geraghty's syringe were now given and following the second or third injection, the patient's symptom of emissions disappeared and verumontanum assumed a normal appearance. He is still being treated for his chronic urethritis.

Finally, it seems to us that discharges in the urethra are perpetuated or rekindled by infection in these glandular structures, and a more wide recognition of this fact will be followed by an increased percentage of chronic gonorrhea cures.

CONCLUSIONS

1. Colliculectomy is a simple operation for removal of the verumontanum. It is less liable to untoward complications and sequelae than strong applications of silver nitrate or the thermocautery.

2. The study of the pathology of the verumontanum is made easy, in consequence of which a therapy will be devised that will be based on science, rather than on empiricism.

3. Surface applications of mild antiseptic solutions seem to be irrational. Strong penetrative cauterant substances may have great therapeutic value in curing infections, but may do more harm than good, on account of the production of untoward complications or sequelae.

4. A straight-beaked colliculectotome lends itself to removal of vegetations and polypi from any part of the anterior urethra.

THE ENDOSCOPIC TREATMENT OF NOCTURNAL POLLUTIONS*

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PHILADELPHIA

With the introduction of a new procedure for the purpose of examination and treatment, there occurs of necessity a period of time before its recognition becomes general and its utility established. After this neophytic period has been successfully passed and the new procedure has established its worth and the medical profession has accepted its new aid, it becomes incumbent on those interested to separate the component parts and special fields of utility of the newcomer and to study in such smaller groups the various advantages and finer details, so that in the end the composite whole stands out the more clearly by reason of the sharp details of its individual features.

This is true at present of the value and use of the endoscope, now securely established as to its utility in examination and treatment, and it behooves us, the urologists, to group the cases, such as chronic posterior urethritis, sexual neuroses and abnormalities, polyps and neoplasms, diverticula, chancres, chancroids and herpes, etc., so as to allow of separate intensive study and analysis, by means of which we may hope to classify the findings, to establish the pathology, and to perfect the treatment by the correlated results.

With this in view I have endeavored to present here a brief survey of my experience in handling cases of nocturnal pollutions by means of the endoscope.

In speaking of nocturnal pollutions or emissions, the question always arises: What constitutes a digression from the normal? This is purely an academic question on which many varying views are held. Suffice it, at this time, to state that I am considering the condition a pathologic one only (*a*), when the pollutions occur more often than twice a week over a period of two months or more, especially when they occur on succeeding nights or when twice or more during one night, or (*b*), when the pollutions leave the patient mentally depressed or physically fatigued during the morning of the succeeding day. I feel that this is a most generous limit.

It has been my universal experience in handling these cases to find, on endoscopic examination of the posterior urethra, varying degrees of pathologic changes in the walls either of the urethra, or more frequently of the colliculus itself.

At times the walls of the posterior urethra are but slightly excoriated with areas or streaks of a raw redness, often covered with superficial granulations that bleed on touch. This comparatively mild irritative reaction is less frequently seen than a general sodden engorgement of the walls, which appear mossy, dark red, redundant, and fold into the end of the urethroscope. Twice I have seen a general varicose condition, which one might call hemorrhoidal, in which the turgescence of the vessels caused the walls to appear actually blue—a venous stasis.

Even more pronounced changes are found involving the colliculus, which is, likewise, the most frequent point diseased. It is found enlarged to double its size, hyperemic, succulent, and especially tender to the touch. At times it has a raspberry appearance, covered with gross granulations; at other times an exudate covers all or part of it. Actual ulceration, by which I mean a localized circumscribed area of erosion, though rare, is occasionally seen. Polyps, retention cysts of either the utricle, the ejaculatory or prostatic duct orifices, have been recorded. And here let me call attention to a condition rather often seen, whose significance I know not, nor have I seen reference to it elsewhere, and that is that in some cases one sees on the colliculus smaller areas of darker red tissue which appear to a certain extent translucent, and you seem to see deeper into the tissue; these areas are flush with the surface but not covered with the normal mucous membrane; they are not ulcerations and have no exudate. They are especially resistant to cauterization and often show remarkably rapid changes in growth. From what tissue I have been able to study histologically, these areas appear to be formed of glandular hyperplasia, and whether or not they have any connection with the occurrence of subjective symptoms I have not, as yet, been able to prove to my complete satisfaction. The question of course immediately arises, Are these marked changes, found in the posterior urethra on endoscopic examination in cases of frequent nocturnal pollutions, the cause or the effect of the emissions?

Sexual function, like other physiologic functions during the period of adolescence, grows with the excessive use of it, and when we search the histories of these cases it is rare indeed that we are not able to find some antecedent, in the form of either a sexual misdemeanor or some irritative infection, to account for the urethroscopic findings and one that will bear on the etiology of the condition.

Twenty-one per cent. of my cases are in a class in which there has been no antecedent history of any infectious urethral disease. Practically every one of these patients has at some period of his life been an excessive masturbator. The cases of this group illustrate repeatedly the gradual creation of a congestion of the sexual apparatus through repeated insults, until permanent pathologic changes, such as cited above, have developed. Practically every one confessed to having performed the act every day over a period of one or more years, while some have been such chronic habitués that they have repeated it as long as erection was possible.

To be sure, in these non-infectious cases, while the pollutions are the effect of the pathologic changes in the posterior urethra, at the same time, they are both indirectly the effect of an excessive libido, and follow some form of excessive sexual indulgence as an antecedent cause. But it is through the increasing and prolonged stimulation of the genital nerves and especially the nerves to the blood-vessels, combined with the mechanical insults, that a static catarrhal condition develops. The described proliferative pathologic processes develop and spread, and with this there appears the common source for both the pollutions and the continuance of an excessive sexual appetite. The sexual misdemeanor, the result of the unsatisfied libido, is the cause of the pathologic changes in their beginning, but when once established, these changes in turn artificially stimulate the libido and either become overpowering to even the strongest will-power, or, if the habit is actually stopped, manifest themselves in the form of frequent seminal emissions on the slightest provocation. Allow me to cite such a case:

R. F. started masturbation early in life and practiced it regularly twice a day, night and morning, for

* Read before the Section on Genito-Urinary Diseases at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

three years. He then desisted and emissions began and soon increased in frequency, until they now occur always twice a week and often to such a degree that, as during the last week, he had five in three consecutive nights. The mildest social pleasures are associated with ejaculation. Even a rub-down after a boxing bout in the gymnasium brings on an erection and a subsequent ejaculation. He never had a urethritis and sexual intercourse is impossible on account of premature ejaculation. On endoscopy the colliculus was found to be so swollen that only part of it could be seen at a time. It was dark red and its surface roughened and appeared to be covered with fine granulations. The urethral walls were markedly engorged. He received three applications of silver nitrate at weekly intervals, and the pollutions diminished in frequency to once in two weeks, and after two months' rest and observation with the continuance of such improvement the patient was discharged from treatment.

Another case with somewhat different history is that of J. C., aged 17, who masturbated in excess for several years, often repeating the orgasm three or more times in immediate succession. He stopped the practice eighteen months ago. At first pollutions would occur once in a month and have gradually increased in frequency until now they occur five times a week, often on succeeding nights, and leave the patient in the morning fatigued and with a dull pain across the small of the back. He thinks that once he noticed blood in the seminal ejaculation. He has never attempted intercourse. On endoscopy there was found on the tip of the engorged colliculus one of the areas of glandular hyperplasia, to which I referred above, appearing as a soft angiomatous spot, of a dark purple color, and a little to the left of the mid-line. It was severely cauterized. After three applications of the cautery by means of the endoscope at weekly intervals the patient reported that he had had no emissions in the passed two weeks and was feeling perfectly well. His posterior urethra was normal and he was discharged.

I have attempted to show how such misdemeanors cause an atonic congestion of the delicate tissues of the erectile colliculus and of the entire prostatic region of the urethra. When once such a condition is established, this pathologic area forms but one segment of a vicious sexual cycle. Should the habit be broken off, as most of these patients attempt to break it, when with years discretion develops, the cycle continues, that is, an irritated and congested posterior urethra, giving stimuli to the sexual centers, causing erection, then more stimuli and ejaculation. The one place to attack and break such a cycle is to cure the region of primary injury in the posterior urethra.

A second and larger group of patients (42.8 per cent.) have given a history of an antecedent gonorrheal urethritis. Although possibly it is not quite fair to group all these infectious cases together, simply because of the past history, yet the changes that one sees in the posterior urethra under such conditions can be told only with difficulty from those of the previous group, and it is often the accuracy of the history as given that makes this type of case to be classified as a postgonorrheal complication. Exudate in the posterior urethra in my experience speaks for infection and is the only sure sign that is telltale of a previous specific urethritis. Often the history is as definite as that of W. H. D., who acquired his initial specific urethritis in February, 1913. It became posterior and was complicated by a right-sided epididymitis. In May the last traces of the discharge disappeared. In August the increasing frequency of nocturnal pollutions attracted his attention for, as before he would have only one in every three or four weeks, since the subsidence of his urethritis, they have gradually increased until now he has three or four a week, often twice a night. Insomnia, lassitude, pains in the hips and back are troublesome subjective symptoms. The urethroscope demonstrated an exquisitely tender colliculus, two or three times normal in size, thickened, engorged, dull and tense, non-ulcerated. Five endoscopic applications of silver nitrate, with lavage of the utricle, at weekly intervals gave prompt results and the patient was given one month's rest. At the end of that period he was sleeping better and had had but one pollution during the month; the pains were all gone. A second report four months later showed that he was perfectly well and normal in all respects.

Three of my patients presented polyps of the posterior urethra. One denied having had gonorrhea, in the second case it was not stated, while the third was complicated by a chronic posterior urethritis. The pollutions have been cured in all by the removal of the polyp and in the third by the subsequent cure of the urethritis.

Local treatment of these pathologic changes has been carried on through an open-air endoscope. Various solutions have been tried out, including zinc and copper sulphate, tannin, argyrol, protargol, iodin, trichloracetic acid, and various combinations that have been found efficacious in the treatment of lesion of the mucous membrane elsewhere about the body. When all is said and you really want work done, however, there is but one universally useful preparation, and invariably, one falls back on different strengths of silver nitrate. I find the 10, 20 and 50 per cent. solutions the best for superficial changes and use the crystal only when I want actually to destroy tissue. One should always remember, when using solutions in the posterior urethra, that after applying the medicament and giving it the necessary time to act, the field of operation should be completely dried with a cotton swab, and if this precaution be observed the patient is spared a great deal of discomfort. Electricity in its various forms has not in my hands given any satisfactory results.

In offering this brief survey it has not been my purpose to convey the idea that every case of frequent nocturnal pollutions is promptly and permanently cured by endoscopic treatment. My hearers are too familiar with the problems of our work to believe such a thing were it even intended. That remarkably beneficial results are obtainable in decidedly more than the majority of cases, however, has been my experience. I know of no distinguishing feature of any individual patient, or history, whereby one can prophesy that this patient he can cure and that one not, although it seems that often the most brilliant results are obtained in the most aggravated cases. Another feature is worthy of remark and that is that frequently the greatest benefit is demonstrated a month or more after all treatment is stopped. This latter feature has rendered it impossible for me to tabulate my results accurately, where a large number of the patients have been derived from dispensary practice with the usual inability to trace the subsequent history of such patients satisfactorily at an interval of six months or a year or more, after discharge. Those who have been

under private observation, however, and those who have responded to inquiry, or have returned for observation, make me sanguine that the results in a large majority have been most happy.

Professional Building.

ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. RYTINA AND RANDALL

DR. H. L. LEITER, Syracuse, N. Y.: In cases with doubtful history if bacteriologic and serologic examinations are made, we will occasionally obtain favorable results. With regard to cauterization of the posterior urethra, I think we should use some discrimination as to what cautery we use. If the whole lining of the prostatic urethra is affected, the solutions of silver nitrate may be effective, but when there are small isolated spots, in my experience, fulguration has worked very well. The photomicrograph of the sinus pocularis illustrates that very well. One could not expect a silver-nitrate solution to get down into that sinus very far, nor the silver stick, but one could put the fulguration wire down there and perhaps the treatment would be more efficacious. I have heard of accidents with fulguration in the prostatic urethra, but in my experience I have had none. Have any of the other members had any accidents with it? Has Dr. Rytina found any process other than inflammatory?

DR. J. D. BARNEY, Boston: Dr. Rytina has made a valuable contribution to our knowledge of the organs at the neck of the bladder. The pictures which he showed were strikingly like those of the seminal vesicle, the ampulla of the vas, and the prostate. When we realize how very complex and how minute are the acini in which a gonorrheal infection can lodge, we will find easier the explanation of the difficulties that we have in curing our cases of chronic gonorrhea. When we realize that these regions resemble a sponge, and how difficult it is to get the sand out of a new sponge, we will understand that long-continued treatment by silver nitrate or massage or fulguration is the only way in which such patients can be cured. The verumontanum is closely similar in structure to the vesicles and the ampulla of the vas, as I have been able to show by pathologic studies of these organs.

DR. F. W. ROBBINS, Detroit: Removal of the verumontanum appeals to us as being radical; we do not hear very much about the dangers that may result from it. Dr. Rytina spoke of the blood-supply of the verumontanum. I have had one or two experiences that assured me that the blood-supply is a factor that should be taken into consideration, and we must also remember that these urethras are septic and manipulation may lead to epididymitis. I had one case in which epididymitis followed removal of the verumontanum. A patient had been suffering much with various nervous phenomena that I attributed to the possible trouble with the verumontanum. The man had had a suprapubic cystotomy (the surgeon thereby hoping to get at the condition through the bladder) as well as milder forms of treatment at many hands. This man had a verumontanum that through the urethroscope appeared to be large, pale and leathery, much like the appearance of the vagina of a prostitute, that has continually been burned with mercuric chlorid solution. This man had as a result of the various diseases an atrophied testis on one side. When I saw the veru, thinking that I could do nothing further with it, I cut it off with a small pair of scissors. Following its removal he went home in good condition, but the next day I found a large amount of blood in his bladder. After breaking up the clots with a large sound, they were readily evacuated. The interesting point, to my mind, was not that he had, following the traumatism, a slight epididymitis on the healthy side, but his neurotic condition, when he felt that the doctor had done the worst thing possible for him in making him absolutely sterile by producing an epididymitis on his only healthy side, the other testis being valueless. The amount of hemorrhage after this operation was a matter of considerable moment, and if we can accomplish the same purpose with the high-frequency current as we can with a cutting instrument, it will be an advantage.

DR. HERMAN L. KRETSCHMER, Chicago: It is not quite clear to me just when we should excise or remove these vera, and when we should be satisfied with local applications. Will Dr. Rytina tell of the condition of the prostate in the patient with infected verumontanum?

DR. LOUIS E. SCHMIDT, Chicago: These chronically infected utricles persist for a long time. Occasionally during the course of such a chronic urethral infection of the adnexa one sees a so-called prostatic abscess arise. I believe that a great many so-called prostatic abscesses are nothing more nor less than pseudo-abscesses of the utricles. These abscesses may reach an enormous size, the fluctuation can easily be felt by rectum, and if, in these cases, we watch the increase of the fluctuating area, we will note that the fluctuation is always in the median line. I am quite certain that these pseudo-abscesses of the utricles are frequently mistaken for prostatic abscesses. Therefore I think it is well always to examine any chronic posterior urethral infection and to treat these conditions, because the possibility of abscess formation is constantly present.

DR. E. L. KEYES, JR., New York: Dr. Rytina has shown us pathologic specimens exhibiting changes in the utricle. He would be the first to say that he could show us similar changes in other urethral glands. The beauty of the dilatation treatment of chronic urethritis, as contrasted with too much dependence on treatment through the urethroscope, is that the effect of pressure extended over a considerable portion or over the whole urethra is likely to do more good in most instances of chronic urethritis than the especial attention to one set of glands which happen to be more visibly diseased than others. With regard to the remarks of Dr. Schmidt on prostatic abscess, the pathologic investigations of the late Dr. Samuel Alexander, which I have been able to verify, are calculated to show that, probably in the great majority of instances, prostatic abscess begins as a miliary suppuration throughout one or other of the lateral lobes of the prostate itself.

DR. JOHN A. HAWKINS, Pittsburgh: Dr. Rytina spoke of the possibility of epididymitis following applications to the verumontanum. In my experience epididymitis rarely follows treatment in the neighborhood of the verumontanum. I have never seen this complication. Will not treatment of this body accomplish as much as removal? The verumontanum is a structure that was put there for a great deal more perhaps than the appendix was put in the abdomen. What direction does the semen take and what prevents the ejaculatory ducts from becoming stenosed after the operation? In 1901 I accidentally removed the top of an enlarged verumontanum. How much of it, I do not know. It did no harm. I have, however, recently doubted the harmlessness of the procedure of removing the entire verumontanum.

DR. FREDERICK R. CHARLTON, Indianapolis: Does Dr. Rytina think he accomplishes anything more than a curetting of the verumontanum, or does he believe that he gets the entire structure? It seems to me, as to Dr. Barney, that we are on the verge of sweeping into a specialist's fad. I cannot for the life of me believe that such enormous importance attaches to the verumontanum alone as it seems to have been given during the last year or two. I have felt that we have been neglecting, perhaps only transiently, the prostate—an admittedly important organ or gland capable of infinite damage. Once thoroughly infected, I question whether it is ever completely restored. I do not know whether anyone is really working hard on chronic infectious prostatitis, and I am much afraid that in the attention we are giving to this almost insignificant structure, we are going to grasp at a shadow and miss the substance of things in this region.

DR. ROBERT H. HERBST, Chicago: I cannot reconcile myself to the belief that the verumontanum is responsible for all that is charged to it. I do agree that we frequently see pathologic changes occurring in this organ, but I am thor-

oughly convinced that, in most instances, these are provoked by discharges from the seminal vesicles. We know that the gonococcus is the common offender in the male urethra and also how frequently this infection spreads into the seminal vesicles. It is the constant discharge of pus from the genital tract which I think is responsible for much of the so-called verumontanum disease. Furthermore, if in these cases we give the attention to the seminal vesicles which they deserve, we will see much of the trouble in the verumontanum disappear without further treatment. I believe that the disturbing element in these cases is primarily located in the seminal vesicles.

DR. ALEXANDER RANDALL, Philadelphia: I call attention to the truly unprecedented and noteworthy work of Dr. Rytina. Thorough search of the literature, last year, enabled me to find but two cursory descriptions of this important structure, the one by Burckhardt, and the other by Delbet, in Poirier and Charpy, Traité d'Anatomie. Dr. Rytina has given a most thorough description of the histology and pathology of the colliculus. The glandular hyperplasia referred to I have seen demonstrated a number of times. Often there is a most extensive hypertrophy with marked infolding of the walls of the acini; at other times the acini are distended with secretion; a third type is that of sclerosis and extensive growth of connective tissue. I feel that one must be careful and should try all other forms of treatment before having recourse to such a radical removal as Dr. Rytina has described, but that this operation has its appointed place. That truly remarkable results can be obtained thereby in carefully selected cases, has been proved to my own satisfaction in the few cases in which I have considered removal to be indicated.

DR. A. G. RYTINA, Baltimore: The microscopic picture of the sinus pocularis somewhat resembles the structure of the normal seminal vesicles, as Dr. Barney pointed out. In the beginning I was in doubt whether to regard these invagination processes as true glands, but, as the lining consists of many layers of squamous epithelium, I came to the conclusion they were not glands, but they do have a secreting surface. Answering Dr. Kretschmer, the patient who had the infected verumontanum had also a chronic prostatitis. When is the operation indicated? I have only recently begun this work and am not prepared to answer this question with authority. We are carrying out extensive researches on operated and necropsy specimens in the human being and perhaps, later, I shall be able to answer that question. Dr. Keyes brought out an important point, namely, the dilatation treatment of the posterior urethra. In the future, perhaps, a therapeutic measure will be to massage the verumontanum through an endoscopic tube. I reported one case of seminal emissions in a patient who had a highly inflamed verumontanum. I made repeated applications without relief. Accidentally I pressed the endoscopic tube against the verumontanum and quite a gush of pus came out. I then injected the utricle several times with the result that the emissions and inflammation disappeared. He had a deep infection which, traveling up, infected the surface of the verumontanum. Probably we will learn later that a highly inflamed verumontanum indicates infection of the deeper structures, just as inflammation about the ureteric mouth causes suspicion of tuberculosis of the kidney. Dr. Hawkins said epididymitis was rare following applications to the verumontanum. I am sure that anybody who has made many applications to the verumontanum has seen more than one case of epididymitis resulting. Do I get the whole verumontanum? It is taken out as thoroughly as can possibly be hoped. The instrument acts as a curved knife and the verumontanum comes out almost intact. Just a very little piece at the base persists after the operation. With Dr. Herbst, I do not believe that the verumontanum causes all the symptoms accredited to it. I am carrying out this work to prove what effect the verumontanum has in so many of these sexual, urinary and referred disturbances. I believe we ascribe too much importance to it as a cause of so many diverse symptoms, and I hope to prove whether or not it is the true causative factor.

ANARTHRIA DUE TO SYPHILIS

REPORT OF TWO CASES

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Of all the forms of neurologic syphilis, the one giving rise to the most sudden, the most profound and startling display of symptoms is gummatous meningitis. Existing throughout the central neural axis, the gravest manifestations naturally arise from interruption of nerve paths in the cerebrum.

Coincident with the marked exudate of albumin and cells evident in the cerebrospinal fluid of such cases, there must be a similar perivascular exudate in the substance of the brain itself, producing, in certain cases, an ischemia of certain foci. Any cranial nerve may be suddenly put out of commission, and as a result the patient may exhibit some form of heterophoria, ptosis, single or double choked disk, unilateral or bilateral deafness, facial sensory or motor disturbances or respiratory difficulty.

Still more bewildering are the symptoms following the blocking of the circulation in the subcortical vessels supplying the coordinating paths. An intensely interesting phenomenon results when the coordinating paths in the lenticular zone are interrupted. This zone includes the lenticular and caudate nuclei, the internal and external capsules, the island of Reil, the motor cortex and the fibers between them.

When this area is the site of disease, the resultant symptom is designated by Marie anarthria, and is the simple motor aphasia of the older writers. There is no paralysis of the vocal organs, but the patient simply does not remember how to speak. A lesion so isolated as to produce this condition alone could hardly be expected in so general an infection as syphilis, but in the following cases this was the most remarkable symptom.

CASE REPORTS

CASE 1.—*History.*—A Russian Jewess, aged 35, was brought to the Neurological Institute, March 23, 1914, because her friends thought she was "losing her mind." She apparently did not understand what was said to her, and they could not understand her when she attempted to speak. In fact, during the past week she had become wild and seemed not to know what she was doing. She attempted on one occasion to jump from the window.

She had been in this country four months and during that time she had spoken with great difficulty and complained of severe pains in her head and weakness of her right leg and arm. During the last day on board ship, four months previously, she asked for a glass of water. When it was brought it was observed that she was unable to hold the glass in her right hand and, furthermore, that any attempt at speech failed utterly. Previous to this she had made no complaint of feeling ill. This condition lasted over night and she was again able to speak the following morning. The patient was taken to her sister's house and the right-sided weakness improved slightly.

Suddenly four weeks later she again became completely unable to speak for three consecutive days, although there was no paralysis of lips or tongue. From that time until the date of admission to the hospital her speech was badly disturbed so that it was with difficulty that she made herself understood. This state gradually deteriorated so that at the time she was first seen at the hospital she was only able to utter curious guttural sounds which her sister and other native Russians said bore no resemblance to any Yiddish words.

Physical Examination.—Physical examination revealed a slender woman of 92 pounds with a dull, expressionless face. She repeatedly put her hand to her head, apparently to indicate pain. Aside from absent ankle-jerks and a slight irregularity of the right pupil there were no physical defects discovered. The pupils responded fairly well to light, possibly better to accommodation. The fundi were normal. Hearing seemed unimpaired. The face and tongue were symmetrical. There was no inequality in the tendon reflexes at the knees or in the arms, the abdominals were also equal. Gait and station were unimpaired, and there was no demonstrable difference in the strength of the extremities of the two sides. The patient's temperature was 98.4 F., pulse 80, respiration 18.

Diagnosis and Treatment.—A diagnosis of cerebral syphilis was made, which was confirmed the following day on examination of the cerebrospinal fluid.

She was then subjected to a series of intravenous injections of salvarsan with gratifying results. The record of the therapy and the effect on the serology are given in Table 1.

TABLE 1.—RESULTS OF BLOOD AND CEREBROSPINAL FLUID EXAMINATION IN CASE 1

Date	Serum Wassermann	Cerebrospinal Fluid Wassermann	Cerebrospinal Fluid Cells per c.mm.	Cerebrospinal Fluid Glob.	Salvarsan, Gm.
3/29/14	++	++	930*	+++	0.5
3/27/14	....	....	196†	+++	0.5
3/31/14	....	++	230‡	++	0.4
4/ 7/14	++	++	68	+	0.5
4/14/14	....	+	19	+	0.4
4/18/14	....	....	...	.....	0.4
4/21/14	+	+	40	+	
4/25/14	....	....	...	.....	0.6
4/28/14	+—	+	24	+	
5/ 2/14	....	....	...	.....	0.3
5/ 5/14	+—	+	26	—	
5/11/14	....	....	...	.....	0.3
5/25/14	....	....	...	.....	0.3
6/ 1/14	....	....	...	.....	0.3
6/ 9/14	—	+	15	—	0.3

* 360 polynuclear, 570 lymphocytes.
† 23 polynuclears, 173 lymphocytes.
‡ This and following counts were lymphocytes.

Outcome.—During the first two weeks in the hospital she kept up an incessant jargon during the day, unintelligible even to Russians, and was noisy and restless at night. She insisted on walking about and had to be restrained. During the third week the patient began to quiet down and to sleep all night. The following two weeks witnessed a complete transformation. Previously irritable and unruly, she now became calm, grateful, and ceased the harsh scolding sounds. Although she could understand no English, she understood fully her native speech and could talk fluently and rationally in Yiddish. In the course of the next month she became animated, interested in her surroundings, thoughtful in regard to others and made herself useful in every possible way. Aside from the complete restoration of speech, the change in personality was little short of marvelous.

On contemplation of what an enormous exudate 1,000 cells per cubic millimeter of cerebrospinal fluid represents, it is not surprising that grave symptoms indicative of cortical involvement are present. The altered disposition observed in the above case was probably due to exudative irritation of the cortex of the frontal lobes. The transient hemiparesis, on the other hand, was no doubt the result of a subcortical lesion in the lenticular zone, ischemic in character, due to occlusion of a small artery, caused by the pressure of the surrounding exudate.

In the following case, besides the subcortical lesion in the lenticular zone producing motor speech disturbance, we again observe cortical irritation phenomena, this time referable to the Rolandic area, as evidenced by the twitchings of the left side.

The lesion responsible for the anarthria was, doubtless, situated more superficially in the lenticular zone of Marie, as described above.

CASE 2.—*History.*—A young man, 26 years of age, applied at the Neurological Institute, Oct. 6, 1913, for relief from a headache which he had had for three months. During the previous four days it had practically ceased, but had been succeeded by involuntary twitching of the left side of the mouth, left shoulder and at times the entire left side of the body. He complained further of sleeplessness and was greatly frightened two days previously by complete loss of the power of speech. He understood what was said and knew what he desired to say but was unable to utter a word. Four months ago he had had a chancre but no secondary manifestations.

Physical Examination.—Searching physical examination revealed absolutely no evidence of organic disturbance save a lower neuron paralysis of the left seventh cranial nerve. He was well developed, skin and mucous membranes were negative, and no glandular enlargement was discovered. The ocular muscles were efficient, the pupils normally active and the fundi negative. There was no pathologic reflex and the tendon and skin reflexes were active and equal. Sensation was not affected.

On the day of his arrival at the hospital the patient spoke with great effort, the difficulty being the expression of the desired words; in fact, many of his replies made no sense at all and were a mere succession of syllables or words. On the other hand, he seemed to comprehend what was said to him.

Diagnosis and Treatment.—A diagnosis of syphilitic exudative meningitis was made. Lumbar puncture corroborated this and a full dose of neosalvarsan was administered intravenously on the day of his admission. It was the intention to make a complete aphasic status on the following day, but during the succeeding twelve hours a phenomenal response to the arsenical treatment occurred. The next morning he could speak without difficulty and carried on conversation in an entirely rational manner. There was also striking improvement in the facial paralysis. There was discoverable at this time, however, impairment of both orientation and memory. He was placed on a mixed treatment of neosalvarsan and mercury as shown in Table 2 and complete recovery resulted.

TABLE 2.—RESULTS OF BLOOD AND CEREBROSPINAL FLUID EXAMINATIONS IN CASE 2 UNDER NEOSALVARSAN AND MERCURY

Date	Serum Wassermann	Cerebrospinal Fluid Wassermann	Cerebrospinal Fluid Cells per c.mm.	Cerebrospinal Fluid Glob.	Neosalvarsan, Gm.
10/ 7/13†	+	+	539*	+	0.9
10/15/13	....	....	...	.....	0.9
10/20/13	+	+	171	+	0.9
10/24/13	....	....	...	.....	0.9
10/31/13	....	+	70	—	0.9
11/ /13‡					
12/ 8/13	+	+	34	+—	0.9
12/12/13	....	....	...	.....	0.9
12/22/13	—	—	16	+	0.9
1/1 & 2/14§					
2/1 & 2/14§					
3/17/14	—	—	12	+—	

* 6 polynuclears and 533 lymphocytes.
† During October, 1913, the patient received fifteen inunctions of mercury and fifteen injections of mercuric chlorid.
‡ 5 injections of salicylate, ℥ xv.
§ Weekly salicylate, ℥ xv.

It is in cases of neurologic syphilis such as these that arsenical therapy has brought about the most striking results. The symptoms in these cases were so grave and the transformation wrought was so complete that an account of them was judged worthy of record.

149 East Sixty-Seventh Street.

Evidence and the Scientific Mind.—The unscientific mind possesses but two compartments, one for truth and one for error. . . . The scientist, however, recognizes no such compartments, for absolute truth and absolute error are unknown to him. After weighing the evidence furnished, his decisions consist only in selecting the degree of his confidence that is merited by that evidence.—G. W. Stewart, *Science.*

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SPRUE TREATED BY EMETIN HYDROCHLORID *

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In a report[1] to the Surgeon General of the Army dated Sept. 30, 1913, I noted six cases in which the patients were suffering from sprue, all of whom markedly improved under treatment by emetin hydrochlorid (alkaloid) given hypodermically in ½ to 1 grain doses daily for five days. Since then I have observed two more cases and four have been reported to me by other medical officers, in which like results were obtained, making a total of twelve cases in which the patient's symptoms cleared up under the same treatment. One of these patients had concurrent entamebic dysentery. No case of sprue which has failed to respond to this treatment has come to my attention.

Permanent results were not observed because most of these patients returned to the United States shortly after receiving the treatment. In only one case have I been able to follow the course long enough to note permanent results.

The patient, a man, aged 40, had an unimportant previous history which was negative for lues. Wassermann and Iuetin reactions were negative. He was first taken ill in September, 1906, at which time he weighed 216 pounds. During the following seven years his bowels never acted normally, digestive disturbances were never absent, and vomiting was frequent and persistent. He was almost continually under treatment both in and out of hospital, usually improving slightly under hospital regimen only to relapse soon after leaving. He took various treatments, including yellow santonin, and diets of buttermilk, raw beef, strawberries, apples and bananas. In 1908, when his mouth became inflamed and tongue raw, his disease was for the first time positively diagnosed as sprue. At this time his sexual power began to wane and was completely lost two years later, and during the three years following he never had an erection or sexual intercourse. In 1912 he went to Spain where he took the strawberry-diet treatment. Then he went to the United States where he was further treated but without improvement, and on the advice of his family physician he returned to the Philippine Islands for the purpose of closing his business affairs, arriving here in May, 1913. At that time his weight was 106 pounds. He then took a course of treatment consisting of old yellow santonin (chromosantonin) in olive oil supplemented by buttermilk diet. There followed a period of slight improvement during which he gained 16 pounds, which was succeeded by a relapse in which he lost 5 pounds.

Sept. 18, 1913, the patient came under my care and the emetin treatment was begun. At this time he weighed 117 pounds, his face showed the bronzed patches on a pale skin so common in sprue. His body was emaciated and his feet were swollen, with slight pitting on pressure. His epigastrium was protuberant and he had a tight feeling of distress extending from the middle to the costal margins. His tongue was glazed, raw and beefy, with ulcers on the dorsum, edges and at the frenum. Emetin hydrochlorid in 1-grain doses was administered hypodermically once daily for five days. The day following the first injection improvement in the ulcers was noted and they continued to improve steadily until completely healed. While receiving the treatment he complained of the activity of his bowels, but one week after the first injection he said that he felt better than he had in a long time. Four months after treatment he weighed 156 pounds. His tongue was still raw but he said that it gave him no subjective symptoms. His appetite and enjoyment of food were excellent. About this time his sexual power which had been lost for three years began to return. By the fifth month he had intercourse and by the sixth month he was normal sexually and has remained so. At the present time, the eleventh month after treatment, he is strong, presents a stout, muscular appearance, his complexion is clear, tongue clean, and there is no evidence of sprue remaining. Weight is 177 pounds. The consistent gain in weight and strength is the more remarkable because the patient under business pressure during the past ten months has been doing without luncheons and working steadily until late at night.

* From the Board for the Study of Tropical Diseases, Manila, P. I.
1. Schmitter, Ferdinand: Mil. Surg., April, 1914.

New and Nonofficial Remedies

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED BY THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION. THEIR ACCEPTANCE HAS BEEN BASED LARGELY ON EVIDENCE SUPPLIED BY THE MANUFACTURER OR HIS AGENT AND IN PART ON INVESTIGATION MADE BY OR UNDER THE DIRECTION OF THE COUNCIL. CRITICISMS AND CORRECTIONS ARE ASKED FOR TO AID IN THE REVISION OF THE MATTER BEFORE PUBLICATION IN THE BOOK "NEW AND NONOFFICIAL REMEDIES."

THE COUNCIL DESIRES PHYSICIANS TO UNDERSTAND THAT THE ACCEPTANCE OF AN ARTICLE DOES NOT NECESSARILY MEAN A RECOMMENDATION, BUT THAT, SO FAR AS KNOWN, IT COMPLIES WITH THE RULES ADOPTED BY THE COUNCIL.

W. A. PUCKNER, SECRETARY.

CANTHARIDIN. — Cantharidinum. — $C_{10}H_{12}O_4$, the anhydride (lactone) of cantharidic acid.

Actions and Uses.—Preparations of cantharidin are used in place of corresponding preparations of cantharides and have the advantage of being cleanly and more uniform in strength. Cantharidin is recognized by the British, French and Swiss Pharmacopeias.

Dosage.—From 0.00025 to 0.0005 Gm. (1/240 to 1/120 grain).

Cantharidin may be obtained from various species of *Cantharis* or of *Mylabris*. It may be prepared by digesting powdered cantharides with a mixture of concentrated sulphuric acid and acetic ether at ordinary temperature, then mixing with barium carbonate and exhausting the mixture with acetic ether. The solvent may be removed by distillation and the residue allowed then to stand for some time to allow the cantharidin to crystallize. The resulting crystals may be washed with petroleum benzin to remove the fat and then recrystallized from hot alcohol.

Cantharidin occurs as colorless glistening, inodorous crystals; 0.1 Gm. on incineration should leave no weighable residue. Cantharidin is very slightly soluble in water, petroleum benzin or alcohol (90 per cent.); more soluble in chloroform (1:65), in acetic ether (1:150), and in acetone (1:40), and is soluble also in fixed oils. A 0.1 per cent. solution in a fixed oil raises blisters when kept in contact with the skin. The melting point is from 210 to 212 C. Cantharidin slowly volatilizes at 100 C., more rapidly at higher temperatures. It is soluble in solution of sodium hydroxide, the solution depositing crystals of Cantharidin when acidified. Gently warmed with sulphuric acid it yields a colorless solution, from which it is separated unchanged when freely diluted with water.

BENZENE, MEDICINAL. — Benzenum Medicinale. — Medicinal Benzol.—Crystallizable Benzol.—C_6H_6.—A liquid consisting almost entirely of benzene (cyclohexatriene).

Actions and Uses.—When swallowed, this drug usually produces a sensation of burning in the stomach. Benzene is a narcotic which, when swallowed or inhaled, produces vertigo, delirium and tonic convulsions followed by deep sleep; 30 c.c. (1 ounce) of nearly pure benzene has proved fatal. In some cases of chronic poisoning petechial spots, due to small hemorrhages, have been observed. These spots have been attributed to fatty degeneration of the blood-vessels. It produces leukocytosis followed by leukopenia with an occasional increased number of erythrocytes. Larger doses may produce an aplastic anemia. It has been stated that the aplastic anemia is due to a contamination of the drug with nitrobenzene or aniline. Benzene has been used occasionally on account of its narcotic properties and has also been used as an intestinal antiseptic. It is, however, rarely used for these purposes at the present time. It has been

somewhat extensively used in the treatment of leukemia. Moderate doses cause a rapid destruction of the leukocytes, especially the lymphocytes. This action is accompanied by an improvement in the subjective symptoms and, in some cases, by a marked reduction in the size of the spleen. In many cases the lymphocytes have been reduced to the normal figure. In others the number of leukocytes has still remained high, although the size of the spleen was reduced. In many cases the improvement is such that an apparent cure is produced. However, a large number, if not all, of these patients relapse or succumb to the toxic action of the benzene. It is recommended to stop the administration of this drug before the leukocytes are reduced to the normal level. Benzene has also been used in a few cases of Hodgkin's disease and in cases of polycythemia. The effect of benzene on the leukocytes is largely enhanced by the previous or simultaneous treatment with the Roentgen ray. The value of benzene in leukemia is not established and caution against too large and too long continued dosage should govern its employment.

Dosage.—0.5 to 1 Cc. (8 to 15 minims) given four times a day. Medicinal benzene may be given in capsules or in an emulsion or may be administered by rectum. Frequent examinations of the blood should be made during the administration of medicinal benzene to determine when it is advisable to suspend the administration of the medicine.

Non-Proprietary Preparation.

Benzene, Merck, H. P., Crystallizable.—Merck & Co., New York.

Medicinal benzene is prepared by fractional distillation of the light oil of coal tar and is a colorless, mobile liquid, possessing a strong characteristic but not disagreeable odor and a burning taste. It has a specific gravity of from 0.881 to 0.885 at 15 C.

Medicinal benzene is insoluble in water but soluble in 90 per cent. alcohol and in carbon disulphide; it is miscible with absolute alcohol and ether. Medicinal benzene is a solvent for bromine, iodine, sulphur, phosphorus, fatty and volatile oils, rubber, gutta-percha, wax, various resins, a large number of alkaloids and some aromatic acids.

Medicinal benzene boils at from 79 to 82 C. It is inflammable and burns with a luminous and sooty flame. When cooled to 0 C., medicinal benzene solidifies. If cooled slowly it crystallizes in rhombohedral prisms, which melt at about 6 C.

It is neutral toward litmus.

Medicinal benzene is not affected by cold sulphuric acid but is soluble in fuming nitric acid, without liberating nitrous vapors. When poured into water the mixture separates and deposits oily globules of nitrobenzene, which can be identified by its characteristic bitter almond odor.

If 2 Cc. of medicinal benzene be shaken with 0.5 Cc. concentrated sulphuric acid and 1 drop of fuming nitric acid, no green or blue tint should be produced.

LEUKOCYTE EXTRACT.—An extract of the leukocytes obtained from exudates produced in the pleural cavities of rabbits or other animals by the injection of an irritant.

Actions and Uses.—Leukocyte extract is believed to increase the immunizing power of the organism into which it is injected.

It is said to be useful as an aid to the action of specific serums or antitoxins and vaccines.

It is claimed to be useful by itself in cases in which the correct bacteriologic diagnosis of the infection cannot be obtained. Its use is still in the experimental stage.

Dosage.—The extract is injected subcutaneously under strict aseptic precautions. The dose may be repeated daily or less often as indicated by the response after injection.

Leukocyte extract is prepared by inciting a purulent exudate in the pleural cavities of rabbits or other animals through the injection of sterile vegetable protein solution.

After the exudate is collected in sufficient quantities, it is aspirated under strict aseptic precautions from the pleural cavities. It is centrifuged and extracts are made of the leukocyte sediment after determining that the exudate is free from bacteria.

LEUCOCYTE EXTRACT-Squibb.—A leukocyte extract prepared according to the method of Hiss.

Dosage.—Not less than 10 Cc. Leucocyte Extract-Squibb is furnished in syringes containing 10 Cc.

Manufactured by E. R. Squibb and Sons, New York City.

It is claimed that biologic and clinical tests have proved leukocyte extract, Squibb, to be of high potency and efficiency.

NON-PROPRIETARY BRANDS OF ACCEPTED ARTICLES

Silver Citrate, Merck.—On heating it yields not less than 62 per cent. of metallic silver. Merck and Co., New York.

Silver Lactate, Merck.—On heating it yields from 50 to 51.5 per cent. of metallic silver. Merck and Co., New York.

Digitoxin, Merck.—Merck and Co., New York.

Therapeutics

PREVENTION IS GREATER THAN CURE

(*Continued from Vol. LXIII, page 2291*)

XIV

THE COMMON INFECTIOUS DISEASES

Before taking up these diseases separately, it may be well to quote Vaughan's Harvey Lecture[1] as to what is scientifically understood by a germ pathogenic to man, and just what infection means. Briefly, Vaughan says that it is the protein poison produced by the germ that causes symptoms. If the germ does not find in our bodies an albumin suitable for its food, it dies and is not pathogenic to us. Also, if our tissues, in individual cases, can produce antibodies or opposing serums or antitoxins rapidly enough to overcome a germ which does find suitable food albumins in us, it will die before it intoxicates us, and we become, at this time at least, immune. Vaughan also says that acute disease or intoxication results when there is rapid multiplication of the infecting germs that find suitable pabulum, its protein toxins causing rapid sensitization of our systems, and a resulting fever which is of benefit. If the production of these pathogenic germs is slow, the result is a chronic infection, and when the proper albumin for the food of these germs is formed only in restricted areas, the result is a local infection.

COLDS

Next to disturbances of nutrition in infants and young children, colds, inflammations of the air passages, are the greatest menace to health. Colds far surpass in frequency any other disease condition. Generally, the older the child, the less frequent the colds, but the susceptibility to catching cold, or the cold habit is of very frequent occurrence in individual children, in some youths, and even in adults. There is no immunity acquired by surviving a coryza, a pharyngitis or a bronchitis; in fact, ordinarily, the person is at least temporarily more susceptible to taking or developing a fresh cold. This may not be quite true of an influenza or grip cold, because many persons have a real or pseudogrip attack early in the fall or winter and are then more or less immune from acute attacks during the rest of that season; but there seems to be no doubt that the influenza bacillus leaves a patient temporarily, at least, more susceptible to other more dangerous germs, as the pneumococcus or tubercle bacillus. Consequently, besides the immediate debility that an acute cold causes, the possibility of opening the way for the entrance of more serious disease should cause every cold to be considered seriously and treated energetically. Also, it should be the object of every mother, nurse, family physician, schoolteacher, medical inspector, board of education and board of health to inaugurate every means possible to prevent colds, that is, to develop the resisting power of the individual; to see that the child is properly clothed; to see that the house and schoolroom air is as free as possible from dust and germs, and that it contains the proper amount of moisture, and to take measures to prevent individual contagion and widespread irritation of the upper air passages from irritants in the air of buildings and localities.

While it is asserted by some that acute colds are always due to germs of some kind, it is conceivable that

1. Vaughan, Victor C.: The Phenomena of Infection, THE JOURNAL A. M. A., Feb. 21, 1914, p. 583.

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a too dry atmosphere, which is the condition in so many houses to-day, may so irritate or congest the nostrils as to allow the least irritant to cause at first a simple inflammation of the mucous membrane, which congested area may later pick up and harbor, or cease to kill, germs. It seems to be an established fact that good outdoor air does not predispose to colds as much as indoor air, and it is a fact that persons whose occupation is indoors are more liable to have colds than those whose occupation is outdoors. Whether or not every cold is due to a contagium or to a germ, chilling, whether indoors or outdoors, certainly predisposes to colds. It is quite probable that chilling of the surface of the body congests the inner organs and possibly the mucous membranes of the air passages. If the mucous membrane of the nose is congested, it more readily becomes inflamed by irritation or by germs.

To repeat, every cold, especially in a young child, should be considered serious. The possibility and the frequent occurrence of complications such as middle ear inflammation, inflammation in one of the accessory sinuses of the nose, broncho-pneumonia or lobar pneumonia must always be a subject for consideration and prevention if possible. Colds and throat infections are also likely to cause enlarged cervical glands and perhaps enlarged bronchial glands. Any one or more of these glands may become infected with tuberculosis. Again, most colds, if not all, are contagious, and are transmitted by contact through families or close associates, and are especially spread by contact in schools.

The first step in the prevention of colds is to ascertain if the child properly breathes through its nostrils. Adenoids and greatly enlarged tonsils should be operatively treated. Hypertrophied mucous membrane or deformed nostrils should be surgically treated, if deemed advisable. The nutrition of the child must be good; if a child is underfed, he must receive more food. If a child is anemic, he must be properly treated with fresh air, good food and iron. Any chronic disease must be discovered. Swabs should be taken from the nose and throat, and cultures made to ascertain if the child is harboring a recognizable pathogenic germ.

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ACUTE CORYZA

This acute nasal catarrh, often called a "cold in the head," is of frequent occurrence in some regions, especially near the seacoast, and occurs repeatedly in certain persons who seem to have a susceptibility to inflammation in the nose. Some persons cannot be exposed to a single draft on any part of the body without an acute coryza starting. Whether their mucous membranes are in such a condition as to allow a recurrence of inflammation from dust irritants or from the congestion caused by chilling, or whether they more or less constantly harbor germs which cause another acute infection, if the mucous membrane is again congested, is a question that has not yet been positively determined. It is supposable, however, that while most acute nasal catarrhs are due to infectious germs, more or less chronically hypertrophied mucous membrane and more or less sluggish circulation in this membrane may allow simple non-infectious catarrhs to occur when irritation of any kind is applied. Other persons who do not have this susceptibility may become chilled, may be subjected to violent cold, damp winds, and may even get wet and still never develop a nasal catarrh. Just as large tonsils more readily catch germs and become diseased, or more readily harbor germs and have recurrent inflammations, so hypertrophied mucous membrane of the nostrils becomes susceptible to reinfection or to reirritation. Frequent acute colds, more or less constant subacute inflammations, or chronic catarrh may result from such a condition.

Some persons are susceptible to certain kinds of irritants, whether it be a particular kind of dust, a particular kind of pollen from plants, or the emanations or odors from stables, horses, etc. If this susceptibility is in excess, or occurs at certain times of the year, the patient becomes a so-called hay-fever or rose-fever sufferer, and then shows symptoms of anaphylaxis.

The pathology of any acute mucous membrane inflammation is divisible into stages, the first being that of congestion and dryness of the surface. With this congestion there is swelling due to dilatation of the blood-vessels and more or less erection of the tissue, and with this swelling, if the mucous membrane is in a narrow canal, there is more or less obstruction, with discomfort, or even pain.

The next stage of the mucous membrane inflammation is the outpouring of a more than normal amount of mucus. The surface of the membrane then becomes moist, and the pain or discomfort becomes less as the tissues become less congested, owing to more or less extravasation of watery secretion and white blood-corpuscles which sooner or later may become pus. This extra secretion is propelled by gravity or by cilia or by voluntary expulsive methods to some external orifice, and the patulency of the part gradually returns. If this inflammation persists the secretion becomes more and more purulent. With a good outlet, and where the irritating and purulent secretions are not too long retained, the tendency of the mucous membrane is to recover, the pus gradually disappears, the secretion becomes mucopurulent, then mucus but in an abnormal amount, and finally the mucous membrane becomes normal, with its normal amount of mucous secretion. However, for some time this membrane is more susceptible to recurrences of inflammation.

The mucous membrane of the nose and throat in some persons may become abnormally dry. This condition is more difficult to treat, and even prolonged treatment may not cause it to become normal. Such persons have what is termed dry catarrh, and unless great care is taken, retain dry strings or plaques of secretion that putrefy and cause a disgusting odor to the breath, a condition termed ozena.

With a localized acute inflammation of the mucous membrane there may or may not be fever, depending on the susceptibility of the individual to an irritation, some persons developing fever readily, others having no fever except under serious provocation.

Applying this pathology to an acute coryza, it is readily understood, with a damming up of the passages from congestion and secretion, that germs, both by their own movements and by pressure, may migrate or be forced into some of the sinuses surrounding the nostrils, and the frontal sinuses are those that most frequently suffer. This is the cause of the frontal headache from the congestion which occurs with most colds, and of an actual frontal sinusitis when infection actually enters these regions. If the same inflammation occurs in the nasopharynx, the mouths of the eustachian tubes may become blocked, and middle ear congestion from aspiration of the air is caused. Also the germs of infection may migrate up these tubes and middle ear inflammation develop.

(To be continued)

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SATURDAY, JANUARY 2, 1915

DEATHS OF PHYSICIANS IN 1914

During 1914 the deaths of 2,205 physicians in the United States and Canada were noted in THE JOURNAL. Reckoning on a conservative estimate of 153,000 physicians, this is equivalent to an annual death-rate of 14.41 per thousand. For the twelve previous years the death-rates were as follows: 1913, 14.64; 1912, 14.13; 1911, 15.32; 1910, 16.96; 1909, 16.26; 1908, 17.39; 1907, 16.01; 1906, 17.2; 1905, 16.36; 1904, 17.14; 1903, 13.73, and 1902, 14.74. The average annual mortality for the period from 1902 to 1914 inclusive was therefore 15.71 per thousand. The chief death causes in the order named were: senility, heart disease, cerebral hemorrhage, pneumonia, accident and nephritis. The age at death varied from 23 to 99, with an average of 60 years, 11 months and 6 days. The general average of age at death since 1904 is 59 years, 9 months and 19 days. The number of years of practice varied from 1 to 75, the average being 33 years, 9 months and 29 days. The average for the past eleven years is 31 years, 11 months and 22 days.

Causes of Death.—There were 225 deaths assigned to general diseases; 229 to diseases of the nervous system; 296 to diseases of the circulatory system; 145 to diseases of the respiratory system; 93 to diseases of the digestive system; 125 to diseases of the genito-urinary system; 3 to diseases of the skin; 3 to diseases of the bones; 411 to senility; 27 to suicide; 111 to accident; 13 to homicide, and 79 after surgical operations. Among the principal assigned causes of death are senility, 411; heart disease, 211; cerebral hemorrhage, 185; pneumonia, 124; accident, 111; nephritis, 108; malignant disease, 56; tuberculosis, 48; appendicitis, 36; diabetes, 33; suicide, 27; septicemia and arteriosclerosis, each 25; angina pectoris, 23; typhoid, 17; gastritis, 14; myocarditis and homicide, each 13; cirrhosis of liver, 11; pernicious anemia, 10; endocarditis, 9; meningitis, 8; rheumatism and cholecystitis, each 7; bronchitis, 6; influenza, locomotor ataxia and scarlet fever, each 5; erysipelas, tetanus, pellagra, general paralysis of the insane, aneurysm, intestinal obstruction, peritonitis, Hodgkin's disease and mastoiditis, each 3; dysentery, syphilis, drug addiction, mental alienation, pleurisy and carbuncle, each 2 deaths, and malaria, small-pox, plumbism, chorea, embolism, ulcer of stomach, ulcer of duodenum, hernia, Addison's disease and retropharyngeal abscess, each 1 death.

The causes assigned for the 111 deaths from accident were: automobile, 25; falls, 17; poison, 10; automobile and railway, 9; railway and drowning, each 8 (of the latter, three were drowned in attempting to save lives); street car, 6; fracture of hip, 5; asphyxiation, firearms and sunstroke, each 4; burns, by animals, freezing and lightning, each 2, and explosion, runover and runaway, each 1. The 27 physicians who ended their lives by suicide selected the following methods; firearms, 13; poison, 10 and asphyxiation, strangulation, cutting instruments and cause not stated, each 1. Of the 13 homicides, 10 were due to firearms, 2 to clubbing or beating and 1 to stabbing. Of these, 4 occurred in feuds or affrays.

Ages.—Of the decedents, 61 were between the ages of 23 and 30; 199 between 31 and 40; 319 between 41 and 50; 432 between 51 and 60; 477 between 61 and 70; 404 between 71 and 80; 193 between 81 and 90; while 21 were more than 90 years of age. The greatest mortality occurred at the age of 62, when 68 deaths were recorded, at 70 with 61 deaths; at 59 with 59 deaths; at 54 and 55 with 58 deaths each; at 74 with 54 deaths, and at 69 when 51 died. There were 7 deaths each at 91 and 92; 3 at 95; 2 at 93, and 1 death each at 94 and 99.

Years of Practice.—By periods of ten years, the physicians died as follows: in the first decade, 162, of whom 7 had been in practice less than one year and 12 less than two years; in the second decade, 304; third decade, 421; fourth decade, 553; fifth decade, 443; sixth decade, 225; seventh decade, 84, and eighth decade, 5, three of whom had been in practice 70 years and one each 71 and 74 years.

Military Service.—During the year, 275 died who had served in the Civil War, and of these 90 had followed the Lost Cause; 83 were medical officers of United States Volunteers, 2 were medical cadets, 10 served in the hospital corps and 2 had been army nurses. There were 2 veterans of the Mexican War; 2 had served in campaigns against the Indians; 17 had been in the Spanish-American War and 7 had been medical officers in foreign wars. The Army lost 9 officers, one of whom was surgeon-general, 3 members of the Medical Reserve Corps and 8 contract or acting assistant surgeons. The Navy lost 12 medical officers, the Public Health Service 10 officers, and the Organized Militia 28 medical officers, of whom 9 had attained the grade of surgeon general.

Medical Positions.—Medical colleges sustained the loss of 146 professors, lecturers, instructors and dem-

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onstrators; hospitals lost 290 members of staffs; municipalities, townships and counties, 165 health officers, and school boards or boards of education, 57 members. There were 29 deaths of members of state boards of health, medical examination and registration and charities; 29 of coroners and medical examiners and 84 of railway surgeons.

Civil Positions.—Of those who died, 1 had been a member of Congress; 1 an ambassador; 7 members of state senates; 39 members of the house of representatives; 39 had been mayors; 25 aldermen; 39 had served in various civil positions; 14 had been postmasters; 20 editors of medical or lay journals; 11 had been clergymen, of whom 2 were foreign missionaries, and 6 had been attorneys.

THE FOURTH CENTENARY OF VESALIUS

Amid these stirring times when the invasion of Belgium and the news of the destruction of Louvain—an ancient seat of learning—have been proclaimed far and wide, we recall the name of an illustrious Belgian man of science whose work has marked an epoch in the history of medicine. The week just closing celebrates the four hundredth anniversary of the birth of Andreas Vesalius, the father of modern anatomy. Born in Brussels on the last day of the year 1514 of an ancestry of physicians and learned men, from whom he inherited a leaning toward scientific pursuits, Vesalius studied at the University of Louvain, later at Paris, again at Louvain and in Italy. He died in 1564.

To appreciate the service which Vesalius rendered to the cause of science, it is necessary to remember that medicine in the sixteenth century was still under the dominance of the doctrines of Galen. When one recalls the almost undisputed sway of Galen's influence for more than a thousand years it is easier to understand how difficult must have been the path of the reformer and how seemingly hopeless the attempt to overthrow the blind adherence to authority. The great importance of Vesalius lies in the fact that he succeeded, where others had failed, in inaugurating a new era of observation and reason. He dared to dispute the words of his masters and to demonstrate directly on the cadaver the error of numerous anatomic claims of medieval medicine. If the anatomist of antiquity stated that the lower jaw-bone of man is divided, as it is in many mammals, Vesalius was ready to prove by dissection that in the human body it is actually a single bone. He could show on the human subject that the sternum has three parts instead of the alleged eight. He found no need of defending the dictum that the thigh-bones were curved in accordance with Galen's teaching. As for the accepted dogma that man should have one less rib on one side, because of familiar scriptural accounts, Vesalius preferred to dispute the contention of the theologians.

The careful study of descriptive anatomy by Vesalius and his successors, in the words of Sir William Osler, restored to men the lost art of clear, independent vision. The slavish obedience to authority which characterized the thought, and more particularly the methods, of the Dark Ages, received a setback. From the point of view of the literature of the medical sciences, special mention should be made of the publication of the book by Vesalius which laid the foundation of modern biologic sciences. This great classic on the structure of the human body, entitled "De Humani Corporis Fabrica," appeared in Basel in 1543, and marks the beginning of modern anatomy. Evidently sound knowledge of structure was necessary before any permanently tenable conclusions respecting the functions of the body could be drawn. In this respect the descriptive text of Vesalius was the forerunner of the subsequent developments in physiology inaugurated by William Harvey.

No reference to the masterpiece of Vesalius would be complete without a tribute to the splendid drawings and highly artistic plates with which the work was illustrated. Just at the present time when some emphasis is again being placed on the quality of the illustrations with which modern texts are being supplemented, it is interesting to note that for executing his plates Vesalius secured the services of a Belgian artist, John Stephen de Calcar, said to be a gifted pupil of Titian.

In estimating the claim of Vesalius to renown, it has well been said that what he did was not so much to discover great truths as it was to overthrow dependence on authority and reestablish the scientific method of ascertaining truth. "The spirit of progress," Locy writes, "was now released from bondage." And with his characteristic felicity of exposition Sir Michael Foster adds: "He taught in such a way that his disciples, even when they thought him greater than Galen, never made a second Galen of him; they recognized that they were merely following his teaching as a whole when they appealed to observation to show that in this or that particular his teaching was wrong. After him, backsliding became impossible; from the date of the issue of his work onward, anatomy pursued an unbroken, straightforward course, being made successively fuller and truer by the labours of those who came after."

Last April a conference was called under the auspices of the Société des Amis de l'Université de Paris, at the Sorbonne, to consider the subject of the fourth centenary of the great anatomist.[1] Vesalius died on one of the Ionian Islands, where he was landed during a return trip from a pilgrimage to Jerusalem

1. The Fourth Centenary of Vesalius, Paris Letter, THE JOURNAL A. M. A., May 2, 1914, p. 1414.

after he had been compelled, it is said, to make a pilgrimage to the Holy Land to clear his soul of sacrilege because of a post-mortem examination made by him. It was intended to erect a monument last August under the auspices of the Belgian government, on the island of Zante where Vesalius died. We hope that when the present hostilities are over some fitting tribute may still be made possible to commemorate the man who placed the structure of the human body in a new light.

STOMACH BITTERS

The prescription of "bitters" of various sorts belongs to those inherited procedures in practical medicine that antedate the modern period of scientific criticism and therapeutic skepticism. Why they are ordered, or what they really accomplish for the person who takes them, has usually either been answered in only the vaguest terms, or overlooked entirely by teachers of therapeutics. As a rule, these "bitters" are believed to stimulate the appetite. Bitters have even been grouped into classes, such as "pure bitters," of which calumba is an example; astringent bitters, to which the decoction of cinchona belongs, and aromatic bitters, including cascarilla or orange. Persons who eat too much and exercise too little were at one time wont to take "sherry and bitters" before dinner "to stimulate the appetite."

So far as the reputed action of bitters is subjective, producing an impression due to suggestion on the individual rather than to any real pharmacologic action of the drugs involved, it is not easy to test the hypothesis of their efficiency in a convincing experimental way. Carlson[1] and his collaborators at the University of Chicago have lately pointed out that the generally accepted assumption of an increased appetite and hunger produced by bitters might result in a variety of ways. The stomachics may directly inaugurate or augment hunger contractions of the empty stomach, or hasten the reappearance of gastric hunger contractions by facilitating secretion and peristalsis, and final emptying of the stomach. They may augment the appetite directly by stimulation of gustatory and other sensory nerves of the mouth, esophagus, or stomach. Finally, the bitters might even be conceived to facilitate the impulses from the mouth so as to bring feeble hunger and appetite sensations more prominently into consciousness.

Appetite and hunger are by no means identical sensations. The relation of bitters to the sensation of hunger is amenable to experimental investigation in view of the now established facts in relation to the genesis of the latter.[2] The hunger sensation is evidently produced by certain types of contraction of the empty stomach. These can be recorded accurately. Hunger pangs are absent so long as the empty stomach is relatively atonic and quiescent.

The Chicago investigators[1] have now studied the effect of such bitters as the tinctures of gentian, quassia, calumba, humulus, condurango, and the elixir of quinin, strychnin, and iron on the hunger sensation in man and animals. The influence of the bitters in the mouth and in the stomach was tested separately. When they are introduced, in therapeutic quantities, directly into the stomach so as not to come into contact with the mouth or esophagus, these drugs have no direct action whatever on the hunger mechanism. When quantities sufficiently large to produce a demonstrable effect are introduced in this fashion, the action is always in the direction of inhibition. Introduced into the mouth, the action of stomachics and bitters is like that of all sapid substances. They stimulate the taste organs and nerves of general sensation in the mouth, and cause reflex inhibition of the gastric hunger contractions. It will thus be seen that the bitters have no effect whatever in the way of augmenting hunger contractions and the attendant sensations.

It is conceivable that aside from the possibilities already described, the "bitter tonics" are capable of exerting a favorable action on the secretion of the gastric juice, and thereby promoting the progress of digestion in the stomach. This question likewise has been put to the direct test of experiment by Carlson and his collaborators. From the facts reported in this issue of THE JOURNAL,[3] the bitters have shown nothing to commend them from the standpoint of increasing digestive efficiency. Whether introduced into the mouth or directly into the stomach, they produced no changes in the acidity or in the pepsin concentration of gastric juice collected either in man or in animals.

This does not exhaust all the possibilities of explanation for the alleged value of these stomachics, especially in digestive disorders. Nevertheless it seems settled that neither the hunger sensation nor the gastric secretory mechanism is affected in the way that many have been led to suppose. The experiments of Carlson were done on normal individuals, whereas bitters are usually prescribed in anorexia arising in relation to alimentary disorders. To postulate some different response in the pathologic as contrasted with the normal individual is a favorite attitude in support of inexplicable therapeutic claims. The possibility must, of course, be admitted; but if direct tests are made on suitable subjects of disordered digestion, we venture to predict, with Carlson and his co-workers,

1. Carlson, A. J.; Van de Erve, J.; Lewis, J. H., and Orr, S. J.: Contribution to the Physiology of the Stomach, XVI, The Action of the So-Called Stomachics or Bitters on the Hunger Mechanism, Jour. Pharmacol. and Exper. Therap., 1914, vi, 209.

2. The Call of the Empty Stomach, editorial, THE JOURNAL A. M. A., Oct. 4, 1913, p. 1300; The Voracity of Certain Diabetics, Feb. 21, 1914, p. 621; New Facts About Hunger, July 11, 1914, p. 169.

3. Carlson, A. J.: Contributions to the Physiology of the Stomach, XXI, The Supposed Action of the Bitter Tonics on the Secretion of Gastric Juice in Man and Dog, THE JOURNAL A. M. A., this issue, p. 15.

that the results will be the same as those reported on normal men.

These new investigations on the possible functions of stomachics and tonic bitters serve to dispel another of the long-established beliefs in the potency of certain popular remedies. As Carlson has well said, even if the therapeutic doses of such tonics are harmless, their use contributes to the drug habit which emphasizes the desire to "take something" instead of "do something." The patient may perhaps be deluded into the belief of "being done good," and may exhibit the benefit of psychologic medicine. After all, the really efficient agencies for improvement in alimentary and nutritive disorders are in most instances not to be found in suggestion or stimulation, but in a well-ordered regimen of work, rest, and diet.

VIEWS REGARDING PNEUMONIC PLAGUE

The outbreak of the great pneumonic plague in Manchuria a few winters ago afforded the first larger opportunity to study the pathologic anatomy of this disease and to examine histologically the lesions that are produced by it. To the earlier reports and particularly to those of the American investigators, Strong, Crowell and Teague,[1] are now added the notes collected by Dr. Wu Lien-Teh, director and chief medical officer of the North Manchurian Plague Prevention Service, and Prof. G. Sims Woodhead of the University of Cambridge, England.[2] They believe that the specimens examined by them afford evidence of the presence of an extremely acute septicemic condition in pneumonic plague. The heart is evidently affected by very active toxins. The liver shows typical examples of lesions produced by specific infective micro-organisms that give rise to toxic substances. The epithelium of the kidneys is modified by a similar toxic activity. It is stated that in the lungs the lesions are far less marked than one would expect were pneumonia the main or most important factor in the disease. The descriptions in the literature of the subject indicate that in plague at least two types of pneumonia, and perhaps even further modifications of these types, are to be dealt with. They differ materially from that set up by the *Diplococcus pneumoniae,* which was never found in the tissue sections.

The views of these latest investigators on the mode of infection is of more general interest. They conclude that in the Manchurian outbreak the amount of the infective material, that is, the dose of the plague bacillus, gaining access to the upper respiratory passages — to the tonsils, fauces, etc.— is of prime importance in determining the character of the septicemia or bacteriemia resulting from a pulmonary infection. It is suggested that in warm countries where the people live in the open and where the facilities and channels by which infection is communicated appear to be those provided by rats and fleas, and where the plague material is carried more directly from one patient to another, or from the rat, by the flea, to the human subject, the local reaction of the tissues and the bubo may prevent the extension of the bacteria, especially if the dose is small and the septicemic condition occurs at a comparatively late stage. If there is a good reaction of resisting tissues the disease may never become septicemic. If, however, the septicemia once develops, it is evident that the internal organs are affected much as in the pneumonic form of plague.

Applying their contentions directly to the Manchurian epidemic, which was at its height in the winter, Lien-Teh and Woodhead[2] argue that the facilities for the inhalation or ingestion of large numbers of plague bacilli were far greater than they can possibly be in warm countries where people live in the open. The patients, residing in badly ventilated houses closed because of the intense cold and artificially heated, may be regarded as living in highly infected incubators of the most approved kind. Septicemias are rapidly developed; and although the lung may in a certain proportion of cases be the primary seat of infection, the late lung symptoms observed seem to point to the occurrence of a secondary pneumonia in a certain proportion of the cases examined clinically.

We have already referred to Teague's views regarding the spread of pneumonic plague.[3] The essence of the contentions put forth in the contribution from the Cambridge pathologic laboratory consists in ascribing the fatal severity of the Manchurian epidemic to the fact that the dose of infective material was always massive and entered by always open and slightly resistant portals. Under such conditions the prognosis is bad. When the advance of the *Bacillus pestis* is so interfered with that not only a local, but a general immunity may be acquired before the bacilli can reach the blood in any considerable numbers, the virulence is greatly lessened.

WATER AS A GASTRIC STIMULANT

It is considered by many that water should be taken sparingly, if at all, during meal time. The recommendation to avoid the ingestion of an abundance of water along with the food is not without an underlying belief in its therapeutic propriety and helpfulness. A custom so well established must express some supposed efficiency of action. The basis for the widely circulated rule that water should never be drunk until long after a meal is eaten probably includes one or more of the following assumptions: 1. Drinking water while eating unduly dilutes or moistens the food, thereby obvi-

1. Strong, Crowell and Teague: Philippine Jour. Sc., (B), 1912, vii, 203. Strong and Teague: Ibid., p. 173.

2. Lien-Teh, Wu, and Woodhead, G. S.: Notes on the Histology of Some of the Lesions Present in Pneumonic Plague, Jour. Path. and Bacteriol., 1914, xix, 1.

3. Atmospheric Temperature and Pneumonic Plague, editorial, THE JOURNAL A. M. A., March 7, 1914, p. 779.

ating a desirable degree of mastication and insalivation. 2. The water dilutes the gastric and other juices to an abnormal and undesirable extent. 3. The food materials are caused, by the large volume of water, to leave the stomach at an unduly early period in the gastric cycle, before the digestive changes that ought to be brought about in this organ have been satisfactorily inaugurated.

If in truth these phenomena were in whole or in part undoubtedly provoked by the ingestion of water with meals, alimentary disturbances might well be expected to follow. As a matter of fact, a large number of experimental data collected on both man and animals by Hawk and his collaborators have failed to disclose any impairment in the utilization of the foodstuffs under the influence of even exceptionally abundant intake of water at meals. This has been verified further by newer experiments of Orr[1] in Aberdeen. Indeed, Hawk goes so far as to suggest that the drinking of water with meals exerts even a desirable influence on a number of the most important of the activities and functions of the gastro-intestinal tract.[2]

Without considering in detail the various alleged beneficial effects, such as the decrease in the development of intestinal bacteria and the consequent diminution in the activity of the putrefactive micro-organisms, which are held to follow the liberal use of water with meals, we may appropriately consider one important phase of the question on which the features just cited are made to depend. Hawk has freely stated that the entrance of water into the stomach stimulates the flow of gastric juice. Not only this, but the juice as secreted has a higher concentration of acid than that produced previous to the entrance of the water. After stimulating the gastric secretion, the main bulk of the water very quickly enters the intestine, but it does not carry with it any appreciable part of the solids present in the stomach.

The assertion that water can function as a stimulant of gastric secretion is by no means a new one. The favorable action has repeatedly been demonstrated on animals, and only very recently by the Chicago physiologists Carlson, Orr and Brinkman.[3] In addition to such evidence, and to the indirect indication that water acts as a gastric stimulant in the human organism,[4] there is now offered direct proof obtained on man.[5] Bergeim, Rehfuss and Hawk note that water (ordinary or distilled), either cold (10.5 C., 50.9 F.) or warm (50 C., 122 F.), is a very strong gastric stimulant and in certain instances yields an acidity of over 100 (c.c. tenth-normal sodium hydroxid to neutralize 100 c.c of juice), in less than twenty minutes. As small a volume of water as 50 c.c. has been demonstrated to have a pronounced and immediate stimulatory power in the human stomach. In the average normal individual, water produces fully as great a stimulation (as measured by acidity and enzyme values) as does an Ewald test meal, and the acidity values follow a similar type of curve. A simple water meal might therefore be substituted in many instances for the Ewald meal, and has the additional advantage of demonstrating any food residues. It was impossible to demonstrate any pronounced glandular fatigue in the human stomach. Identical volumes of water introduced into the stomach of the same man at different times during the same afternoon yielded very similar acidity values. Under all conditions the increased acidity following water stimulation is accompanied by increased peptic activity, although the two types of values do not necessarily run parallel.

In one human subject the Philadelphia investigators obtained definite evidence that 500 c.c. of water left the stomach in from ten to twenty minutes after its introduction. The occasional efficiency of the stimulus is shown by the fact that at least 225 c.c. of gastric juice of relatively high acidity were secreted after an initial stimulus afforded by 50 c.c. of distilled water.

The stimulatory power of the water was not influenced in any uniform way by the volume of fluid introduced into the stomach. In some instances a small volume of water gave a pronounced stimulation, whereas in other tests the response was relatively less pronounced when a larger volume of water was employed. How radical the suggestions following from these newer gastric studies are is indicated by the proposal that since water stimulates the gastric glands to activity when no food is present in the stomach as well as when there is a digestive task to complete, it would seem a waste of "glandular energy" to drink water between meals. It would seem that water could best further the digestive plan when taken with meals.

A further outcome of the use of water as a gastric stimulant is the indication that the values (from 40 to 60) commonly accepted by clinicians as normal values for gastric acidity are undoubtedly too low. The acidity of the gastric juice secreted after water stimulation ranged from 50 to 120 (from 0.18 to 0.44 per cent. hydrochloric acid) with an average value of 77 (0.28 per cent. hydrochloric acid).

1. Orr, J. B.: The Influence of Excessive Water Ingestion on Protein Metabolism, Biochem. Jour., 1914, viii, 530.
2. A discussion of "The Relation of Water to Certain Life Processes and More Especially to Nutrition," was presented by Hawk before the American Philosophical Society in Philadelphia, Feb. 6, 1914; see Biochem. Bull., 1914, iii, 420.
3. Carlson, Orr and Brinkman: Am. Jour. Physiol., 1914, xxxiii, 86.
4. Wills and Hawk: Proc. Am. Soc. Biol. Chemists, 1910, ii, 23; Jour. Am. Chem. Soc., 1914, xxxvi, 158.
5. Rehfuss, M. E.; Bergeim, O., and Hawk, P. B.: Gastro-Intestinal Studies, II, The Fractional Study of Gastric Digestion, with a Description of Normal and Pathologic Curves, THE JOURNAL A. M. A., Sept. 12, 1914, p. 909. Direct Demonstration of the Stimulatory Power of Water in the Human Stomach, Jour. Biol. Chem., 1914, xix, 345.

And It Is Still True.—". . . nothing can be more pernicious to the Health of the People, than a numerous Trade, which, to maintain itself, shall be urging the Vent of Physic in great Quantities to all Ages, Constitutions and Diseases." —R. Pitt, M.D., in The Crafts and Frauds of Physic Exposed, London, 1703.

V. 6
1915

Current Comment

THE NEW YORK TRIBUNE'S CAMPAIGN

These be parlous times for the medical faker. The New York *Tribune* recently entered the lists against the quack and the fraudulent "patent medicine" with an educational campaign that promises to have far-reaching effects. The motto of the *Tribune* is: "First to Last the Truth: News, Editorials, Advertisements." Naturally, living up to such a motto bars practically all medical advertising. But the *Tribune* has gone further. A few weeks ago it announced that it would guarantee its readers against loss or dissatisfaction through the purchase of any wares advertised in its columns. Such a step on the part of a daily newspaper is, we believe, unique. A few high-class magazines give their readers this protection, but, so far as we know, no newspaper has ever assumed such a task as that undertaken by the New York paper. As the *Tribune* says:

> Out of our armory of defences goes the comfortable old doctrine of *caveat emptor*, that favorite refuge of the newspaper whose hands are full of not over-clean advertising revenue. *Caveat emptor* is the strict letter of the law, but we shall never retreat behind it. In practice it means that the reader takes care while the newspaper takes the money. Under our system he does not have to take care. We will do the taking care for him.

Should newspapers over the country, generally, take this stand, it would sound the death knell of the fraudulent "patent medicine" industry. Imagine, if possible, a newspaper guaranteeing its readers against loss from taking "Pulmonol" or "Eckman's Alterative" for consumption, from taking "Swamp Root" or "Doan's Kidney Pills" for Bright's disease, from taking "Wine of Cardui" or "Lydia Pinkham's" for "female trouble," from taking Coutant's alleged cure for deafness, from using Plapao Pads for rupture, from taking any of the thousand and one wickedly exploited cures for cancer — imagine a newspaper that guaranteed its readers against "loss or dissatisfaction" carrying such advertisements! It isn't conceivable that any paper that had the interest of its readers sufficiently at heart to take the stand the *Tribune* has could, in the nature of the case, accept advertisements from fraudulent "patent medicine" concerns and quacks. Yet, as a moral principle, the new standard set by the New York *Tribune*, while so far in advance of the procession, is merely one of simple, elemental honesty. It is the stand that is taken by every honest man in business. The rapid change that is now taking place in the advertising world makes one optimistic. We believe that, before the present decade has passed, the position taken by the *Tribune* will be accepted as a matter of course by the majority of decent newspapers throughout the country. In the meantime, every right-minded citizen should throw the power of his influence behind those publications that are waging war against frauds and leading in the fight against those powers of evil that menace both public health and public morals. More power to the pen of the New York *Tribune*.

AN EARLY WORKER IN INDUSTRIAL HYGIENE

Nothing comes closer to actual humanitarianism than the prophylaxis of the ills caused by special occupations. Men must work to live, and if the work itself brings death, a vicious circle is created. Nov. 5, 1914, occurred the two hundredth anniversary of the death of Bernardino Ramazzini, the great leader in the study of the "hygiene of artificers." His name, like that of many noted medical men, is unfamiliar to most physicians of to-day. He was professor of the theory and practice of medicine in the historic school at Padua from 1682 to 1700. His chief work, "Health Preserved: I. On the diseases of artificers, which by their particular callings they are most liable to; with the method of avoiding them and their cure. II. On the distempers which arise from particular climates, situations and methods of life," is the work on which rests his claim to fame. This was translated, within a short time, into German, English, Dutch, Italian and French, and numerous editions were published. A German translation of his various medical works was published at Leipsic in 1828, and in 1912, F. Koelsch, chief of the factory inspection service in Bavaria, wrote a book describing Ramazzini's life and works. Professor Pogogeff of Moscow, founder of the museum of sociology there, organized an international exhibition of safety appliances in industry and for the prophylaxis of occupational diseases, to open in Moscow, November 5, but the war unfortunately put an end to all preparations. At Milan, however, the anniversary was celebrated with exercises at the Clinica delle malattie professionali, devoted exclusively to occupational diseases. The director of the clinic, Professor Devoto, delivered an address on Ramazzini's life and work before an audience of the working class and again before a medical audience, the address being published later in the *Lavoro*, a fortnightly periodical published by this enterprising clinic. A further honor to the great work of Ramazzini is the naming of the Italian periodical founded in 1907 by C. Biondi and L. Bovri, to advance the cause of social medicine, *Il Ramazzini*.

SAFETY IN THE MINING INDUSTRY

The report of the director of the Bureau of Mines for the year ended June 30, 1914, which has just appeared, shows a constant increase in the safety of workmen engaged in mining, though the loss of life is still great. During the year more than 3,500 men were killed and more than 100,000 injured in this industry. It is believed that one-half of the fatalities and three-quarters of the injuries were easily preventable, and much of the estimated twelve millions of money loss ultimately paid by the consumers should have been saved. Among the causes assigned for these casualties are mine explosions and mine fires, many of which were caused indirectly by electrical apparatus; the improper use of explosives and the use of improper explosives, directly or indirectly the cause of a large proportion of the fatal accidents, among which are accidents to shot firers; and injury to the health of the

miners from poisonous gases given off by improper explosives, and from generally poor ventilation of the mines. The last is said to be true particularly of the metal mines, statutory provisions in regard to ventilation in the metal mining states being incomplete and inadequate, with no efficient system of ventilation generally in force. Although improvement has been made, there is still necessity for more extensive use of safety appliances. It is said that during the past five years through lack of such appliances more than 3,500 men have been killed and 20,000 seriously injured. To prevent injury to shot firers it is recommended that shots be fired by electricity from the outside of the mine and not in the present careless manner. The bureau has not only attempted to prevent coal-dust explosions, but also has devised means in the form of barriers loaded with stone dust for stopping such explosions after they have started, localizing them to the part of the mine in which they originate and thus saving miners in other parts. Improvements in explosives have also been made through the introduction of new types of low-temperature, quick-flame powders which may be used in the more dangerous mines. Instruction in mine safety and mine rescue work has continued, and the total number of miners trained by the bureau has now reached 25,000. First-aid stations have been established at hundreds of mines. The report says the states spend more money than the government for improvement in mining conditions, and the bureau complains that its work is handicapped by insufficient funds.

AID FOR DEVASTATED BELGIUM

In our news columns and in the London letters, we have mentioned frequently the pressing calls for aid to Belgium. In London a committee was formed, headed by Sir Rickman Godlee, to take up the care of needy physicians and surgeons in the little war-wrecked country. An appeal sent out by Professor Jacobs of Brussels describes conditions of destitution that are horrifying and almost unthinkable in their immensity. An American committee has been formed, consisting of many representative physicians and surgeons. Sunday, December 20, an organization meeting was held in New York. Dr. Howard Canning Taylor was elected secretary, and an executive committee was formed of which Dr. Frank F. Simpson, the treasurer, is a member. Dr. Bates, of the Commission for Relief in Belgium, has promised to distribute in Belgium without cost, food, surgical dressings, drugs, or instruments, and information is being gathered as to what is most needed. For the present, money contributions only are accepted. The treasurer, Dr. F. F. Simpson, Jenkins Arcade Building, Pittsburgh, to whom money should be sent, will publish each week a list of contributors. The cause is meritorious, the need pressing, the objects, brother physicians who are the unfortunate victims of circumstance. The American physician who helps in this crisis will aid to establish even more firmly the bond of brotherhood which has ever characterized men of science.

EXERCISE, BODY TEMPERATURE AND THE PULSE-RATE

Muscular exercise, even of a moderate sort, is attended by a number of conspicuous phenomena. The heart-beat becomes more rapid, the blood-pressure is raised, the temperature is elevated somewhat and pulmonary ventilation is increased. In bringing these useful functions into heightened activity a variety of factors are presumably involved. Ordinarily a rise in blood-pressure is attended with a slowing of the pulse; but after exercise the rise is accompanied by cardiac acceleration. The most important factor in the immediate quickening of the pulse-rate is doubtless the central nervous system, and presumably it operates by depression of the cardio-inhibitory center. The acceleration of the heart-beat does not cease immediately with the interruption of muscular effort, but commonly persists for a shorter or longer time. The return to the normal is almost always quicker in the trained than in the untrained person. Different physiologists have held more or less conflicting views respecting the cause of the persistent augmentation of the pulse. The Danish physiologist, Johansson, for example, has maintained that products of metabolism, arising as a consequence of exercise, are responsible for the quickening. Mansfeld has charged it to the rise in temperature of the blood flowing to the heart. Drs. Martin, Gruber and Lanman[1] of the Harvard Medical School argue that if persistent acceleration of the heart after exercise depends on the temperature of the blood, careful comparisons of body temperature and pulse-rate after exercise should show an interdependence between them. Moreover, the striking prolongation of the acceleration sometimes seen in untrained as compared with trained men should be correlated with a definite difference in the period of heightened body temperature. They have, therefore, made a careful comparison of the interrelation of the two factors in man with results which seem to show clearly that whatever may be the mechanism of the persistent cardio-acceleration of exercise, body temperature has little to do with it. Some other cause than the rise in blood temperature must be sought as the sustaining agent. It seems well established that variations in metabolic activity in man are accompanied by variations in heart-rate.[2] Whether heightened metabolic activity is the cause of an augmented pulse, or whether the two depend on a common antecedent stimulus, does not appear. Benedict and Cathcart[2] have noted that the metabolism, as measured by the oxygen absorption, continued high after exercise for periods comparable with those of augmented heart action. From the work of Martin, Gruber and Lanman, it also seems unlikely that the metabolic effects are directly dependent on an increase in the temperature of the blood. Other possibilities now need to be examined critically.

1. Martin, E. G.; Gruber, C. M., and Lanman, T. H.: Body Temperature and Pulse-Rate in Man After Exercise, Am. Jour. Physiol., 1914, xxxv, 211.

2. Benedict, F. G.: Influence of Inanition on Metabolism, Carnegie Institution of Washington, Publication 77. Benedict, F. G., and Carpenter, T. M.: Metabolism and Energy Transformations of Healthy Man During Rest: Ibid., No. 126. Benedict, F. G., and Cathcart, E. P.: Muscular Work: Ibid., No. 187.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST; SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION, PUBLIC HEALTH, ETC.)

ILLINOIS

Roentgen-Ray Equipment Installed.—A complete Roentgen-ray equipment has been secured at a cost of about $2,000, and will be installed in the new wing of St. Joseph's Hospital, Elgin next week.

Military Surgeons Elect.—At the annual meeting of the Association of Military Surgeons of the State of Illinois held in Chicago, December 28, the following officers were elected: president, Lieut.-Col. Jacob Frank, Chicago, surgeon-general of Illinois; vice-president, Captain Arthur F. Wilhelmy, Decatur, and secretary-treasurer, Brig. Gen. S. C. Stanton, Chicago (reelected).

Hospital Faces Burden of Debt.—At a meeting of the board of directors of the Monmouth Hospital, December 15, the physicians presented a formal communication requesting that action regarding the proposed change of management be deferred for a period of one year. This action of the medical men directly opposes the recommendation of the finance committee. The hospital at present faces a debt amounting to about $3,000 and without any probability of immediate payment.

Chicago

Zones of Quiet.—A number of physicians appeared before the common council health committee, December 21, to present appeals for the establishment of zones of quiet around all hospitals.

Morals Board Appointed.—The names of thirty persons recommended to the mayor by the vice commission to aid his choice of the newly created morals commission included the following physicians: Drs. William A. Evans, W. J. Hickson, Sidney Kuh, Willis O. Nance, William Healey and Clara Seippel.

Low Mortality for Chicago.—The records of the health department for the year of 1914 show that the death-rate was 14.17 per 1,000. This is 3.6 per cent. less than the average yearly rate for the last decade and 6.2 per cent. less than the rate for the previous year. The chief reductions are in deaths from typhoid fever and from infantile diseases.

Polish Physicians Meet.—The Chicago Polish Medical Society held its annual meeting December 18, and elected Dr. Wladyslaw A. Kuflewski, president; Dr. Thaddeus Z. Xelowski, vice-president; Dr. Alexander Pietrzykoski, secretary, and Dr. Stanislaus Boguszewski, treasurer. Resolutions were adopted to aid the widows and orphans of Polish physicians in Poland and a subscription list has been opened for this purpose by the secretary.

The Cost of Tuberculosis.—Dr. Theodore B. Sachs estimates that tuberculosis costs an economic loss of more than $30,000,000 a year in Chicago. The opening of the Chicago Tuberculosis Sanatorium in February, will, he hopes, tend to reduce this loss by the reclaiming of many victims. The institution will have, at its opening, a capacity of 650 beds and by the end of the year the capacity will be increased to 950. It is provided with a maternity division, a department for children, a nursery, open air housing and comprehensive laboratories. The institution is located on a tract of 160 acres of land at Peterson, Crawford and Bryn Mawr avenues, and already has about 35 buildings, one of which has a frontage of 1,000 feet.

INDIANA

New Societies Organized.—The Indianapolis Pediatric Society has recently been organized with Dr. James H. Taylor as president, and Dr. E. B. Mumford, secretary.——Kendallville Medical Society was recently organized with Dr. Cyrus A. Gardner, president, and Dr. Harold O. Williams, secretary-treasurer.

Clinic at Anderson.—Physicians of Anderson met with a committee from the Anderson Council of Women, December 15, to confer regarding the advisability of establishing a free clinic in Anderson. There was no question regarding the necessity of the clinic, but its site was discussed and eventually left to a committee of six to investigate and report at a meeting January 6.

Personal.—Dr. Albert C. Kimberlin, Indianapolis, fell December 17, spraining his ankle and probably fracturing bones of his left foot.——Dr. Blanchard B. Pettijohn, Indianapolis, has resigned his commission as first lieutenant of the Medical Corps, Ind. N. G.——Dr. Tiffin J. Shackelford, Kokomo, who has been seriously ill in Chicago, is now convalescent at Muncie.——Dr. Frank L. Truitt has been elected medical director of the Reserve Loan Life Insurance Company, Indianapolis.——Dr. Richard A. Poole, coroner of Marion County, has appointed Drs. Paul F. Robinson, Edwin S. Knox and Herbert T. Wagner as deputy coroners.——Dr. Harry M. Hosmer, Gary, who met with an accident December 11, which it was thought would result in the loss of both eyes, is convalescent and will regain his eyesight.——Dr. Augustus L. Marshall, superintendent of the Indianapolis City Dispensary, suffered an electric shock and burns of the right hand, December 15.——Dr. Thomas L. Sullivan, Jr., has been appointed superintendent of the Indianapolis City Hospital.——Dr. Lee M. Barney, formerly of Elkhart, but more recently of Miami, Fla., has been awarded damages of $41,500 from the casualty companies on account of the loss of sight from a chemical explosion which occurred while he was making experiments in his laboratory.——Dr. A. Golding Chittick, Frankfort, has been appointed health officer, vice Dr. George W. Brown, resigned.

Two Units of New City Hospital Opened.—Two units of the new Indianapolis City Hospital are now partly in use. They represent the most modern type of hospital construction and embody several features which are unique. The mural decorations previously mentioned (THE JOURNAL, Dec. 5, 1914, p. 2049) are in part completed. The panels painted by Mr. T. C. Steele for the men's ward are of the best type of American art. Mr. Otto Stark has completed the "festival of toys" for the children's ward; a rising young colored artist, Mr. William Scott, has done an immense amount of work in the corridors. The value of these decorations can be calculated only in the pleasure which thousands of sufferers will derive from them. The cost of the two Burdsal units, approximately $350,000, is a monument to the economy of the administration. All floors are built with subfloors, making possible instantaneous access to heating, ventilating and plumbing apparatus. This innovation is a move toward future economy that will be a reminder of the forethought which planned it. The entire cost of the many feet of mural decorations has been slight, and the results are delightful. The hospital is inviting and pleasant, and the city authorities, headed by Mayor Bell, are being widely commended for this unique advance in hospital construction.

NEW YORK

Personal.—Dr. Garret K. W. Schenck, Rockaway Beach, has been appointed assistant chief surgeon of the Polyclinic Hospital, Manhattan.

Appropriation for Sanatorium Maintenance.—The board of supervisors of Tompkins County appropriated at its December 16 meeting $8,000 for the maintenance of the Meany Sanatorium at Taughannock Falls. This sum, with the $2,800 left over from last year's appropriation, makes available $10,800 at the beginning of the fiscal year, February 1.

New State Sanitary Code.—The Public Health Council of the State Health Department has adopted regulations which will become effective on March 1. These regulations have the same force as a statute enacted by the legislature and make violation a misdemeanor. Among other things the code puts a ban on the common drinking cup, the common towel, the unclean barber cup and hair brush, spitting on the streets and in public buildings, and insists on special regulations of manicurists and chiropodists.

New York City

Personal.—Dr. Richard Derby, who has been in the American Ambulance Hospital, Neuilly, France, has returned to his home and will resume his work at St. Luke's Hospital.——Dr. John H. Parker, who has been ill with septicemia due to a glass wound of the knee, is reported to be improving.

Disinfection of Cars.—The Interborough Rapid Transit Company writes the health department that they have been studying the efficiency of various disinfectants and their conclusions coincided with those of representatives of the department who have questioned the value of disinfectants for car cleaning purposes. They have therefore arranged to discontinue the use of disinfectants for this purpose, but are making an effort to cleanse cars by mechanical means and frequent airing.

Decrease in Street Car Accidents.—There was a marked decrease in the number of street car accidents during the month of November, 1914, as compared with the same period of 1913. The number of persons killed in November, 1913, was 31, against 18 for November, 1914. The total number of accidents for November, 1913, was 3,557, while for November, 1914, it was 3,153. The falling off in the number of accidents is attributed to the near-side stop of street cars which went into effect on November 1.

Campaign Against Habit-Forming Drugs Progresses.—The campaign against illegal sellers of drugs is being energetically prosecuted. Within the space of three days three sources furnishing large amounts of narcotics have been located. The largest supply seized in years was taken on December 21 on the lower East Side. It was valued at $10,000 and included 150,000 pills and 37 boxes of powder. At about the same time it was learned that steamships from Liverpool were bringing over supplies of drugs and a search of the *Adriatic* which had just docked was found to have brought 100 small cans of opium selling at $50 per can. In the Harlem district six arrests have been made of persons selling cocain to schoolchildren; these individuals were held in bail for amounts from $500 to $2,500.

OHIO

State Board Election.—At the annual meeting of the Ohio State Board of Health held in Cleveland recently, Dr. Henry T. Sutton, Zanesville, was elected president; Dr. William T. Miller, Cleveland, vice-president.

Personal.—Dr. George W. Crile, Cleveland, has started for Europe for work with the American Ambulance, Paris.——Dr. William H. Wood, Smithfield, was operated on recently in Chicago for the removal of a cataract.——Dr. Alexander Hitchcock, Port Clinton, is reported to be seriously ill as the result of a cerebral hemorrhage.——Dr. W. T. Barger, Cleveland, has accepted a permanent position on the medical staff of the Jackson Health Resort, Dansville, N. Y.——Dr. H. E. Ward, Custar, is reported to be seriously ill at his home as the result of an automobile accident.

Antituberculosis Items.—R. G. Patterson, secretary of the State Antituberculosis Society, at a meeting of the local society at Chillicothe, recommended the erection of a district hospital with a capacity of fifty beds at an expense of $50,000.——Plans are in consideration for the erection of a division to the Butler County Tuberculosis Sanatorium which will allow the accommodation of at least twenty-five more patients and an expense of not more than $3,500.——Springfield Lake Sanatorium for Tuberculosis, erected by Summit, Portage, Mahoning, Stark and Columbiana counties, near Akron, at a cost of $280,000, was formally opened January 1. The institution will accommodate 150 patients.

Health Federation Formed.—For the support of legislation designed to promote public health and oppose measures deemed to be harmful, the Ohio Public Health Federation has been organized, the members of which are the Ohio Society for the Prevention of Tuberculosis, the Ohio State Medical Association, Ohio State Eclectic Medical Association, Homeopathic Medical Society of Ohio, Ohio State Dental Society, Ohio State Pharmaceutical Association and the Ohio State Veterinary Association. Heads of the state departments which have public health functions will cooperate with the federation. The State Board of Health, State Blind Commission, State Medical Board and the State Board of Pharmacy are so represented. The following are officers of the federation: president, Dr. Willard B. Carpenter, Columbus; secretary, Prof. Edward Spease; assistant secretary, G. V. Sheridan; and treasurer, Dr. John H. J. Upham, Columbus.

GENERAL

Lecture at Army Medical School.—Dr. Harvey Cushing, professor of surgery in Harvard University, delivered an illustrated lecture on "The Portraits of Vesalius," on the evening of December 29 at the Army Medical School, Washington.

National Leprosarium.—Surgeon-General Rupert Blue, U. S. P. H. S., has recommended to the commerce committee of the house of representatives the establishment of a national leprosarium, under the control of the public health service. There are now 146 cases of leprosy on record in the United States.

Eastern Pediatrists Hold Election.—At the annual meeting of the New England Pediatric Society held in Boston, December 4, the following officers were elected: president, Dr. Edward M. Buckingham, Boston; vice-president, Dr. Edmund F. Curry, Fall River, Mass., and secretary-treasurer, Dr. Richard M. Smith, Boston.

Southwestern Practitioners Meet.—At the annual meeting of the Southwestern Medical and Surgical Association held in El Paso, Tex., December 11 and 12, the following officers were elected: president, Dr. John E. Bacon, Miami, Ariz.; vice-presidents, Drs. Jesse R. Gilbert, Alamogordo, N. Mex., and James Camp, Pecos, Tex.; secretary-treasurer, Dr. Charles P. Brown, El Paso, Tex. El Paso was selected as the place of meeting for next year.

Indian Service Notes.—Dr. J. A. Murphy, medical supervisor, Phoenix, has gone to Sacaton, Pema Agency, for several weeks.——A new hospital for the Indians of northeastern Minnesota, the cost of which was provided for in the last Indian appropriation, is to be erected at Cloquet, Minn.——Dr. Frank J. McKinley, Pala, Cal., has been transferred as superintendent at Schurz, Nev.——Dr. Peter A. Slattery has been transferred from Fort Bidwell, Cal., to Acomita, N. Mex.

Tri-State Medical Society Meeting.—At the annual meeting of the Tri-State Medical Society of Arkansas, Louisiana and Texas, held at Shreveport, La., December 8 and 9, the following officers were elected: president, Dr. William G. Hartt, Marshall, Tex.; vice-presidents, Drs. Edwin L. Beck, Texarkana, Tex.; Oscar Dowling, Shreveport, La., and Edward H. Martin, Hot Springs, Ark.; secretary-treasurer, Dr. Jacob M. Bodenheimer, Shreveport, La. (reelected). The next meeting will be held in Marshall, Tex.

Canal Zone Physicians to Meet in San Francisco.—The Medical Association of the Isthmian Canal Zone announces that at the November meeting of the society it was decided to hold an extraordinary session at the Panama Pacific Exposition, San Francisco, some time during the medical period, and preferably about June 14, and the society requests that all former and present members will endeavor to assemble at San Francisco during that week, prepared to support those in charge of the session. Members living near San Francisco are asked to communicate with the officials and express their intentions as regards attendance.

Bequests and Donations.—The following bequests and donations have recently been announced:

St. Louis Medical Society, $42,000 left in trust by the administrators of the estate of Mrs. Francisca Bartscher, mother of the late Dr. Hugo Bartscher, as a memorial of her son.

For the relief of the aged poor of Indianapolis, the bulk of the estate valued at $250,000, by the will of Mr. William L. Higgins.

German Hospital, New York, $5,000 by the will of Joseph Kuder.

St. John's Guild, New York, for the benefit of the Sea Side Hospital, $10,000 by the will of Laura V. Rhinelander.

St. Luke's Hospital, New York City, and Society for the Relief of the Destitute Blind, each $5,000 by the will of Miss Augusta Jones.

Maimonides Hospital, Chicago, $2,000 appropriated by the Federated Orthodox Jewish Charities.

Chicago Lying-In Hospital, $10,000, the proceeds of an opera performance at the Chicago Auditorium, December 18.

The Lane Lecture for 1915.—Dr. Frank Billings, Chicago, has been selected to deliver the Lane Lecture for 1915. He is the fifth American to be so honored. A list of the previous lecturers follows:

1896. Sir William Macewen, M.D., Regius Professor of Surgery, University of Glasgow. "Surgery of the Brain."

1897. Christopher Heath, F.R.C.S., Professor of Clinical Surgery, University College, London. "Congenital Malformations, Aneurism, and other Surgical Topics."

1898. Thomas Clifford Allbutt, M.D., F.R.S., Regius Professor of Physic, University of Cambridge, England. "Diseases of the Heart."

1899. Nicholas Senn, M.D., Ph.LL.D., Professor of Surgery, Rush Medical College, Chicago. "Topics in General Surgery."

1900. Sir Michel Foster, K.C.V., D.C.L., Professor of Physiology, Cambridge, England. "History of Physiology."

1901. Sir Malcolm Morris, F.R.C.S., Edinburg, M.R.C.S., England; Surgeon, Skin Department St. Mary's Hospital, London. "Social Aspects of Dermatology."

1902. Sir Charles B. Ball, M.Ch., F.R.C.S., Regius Professor of Surgery, University of Dublin. "Diseases of the Rectum."

1903. Oscar H. Allis, M.D., Philadelphia, Pa. "Dislocations and Fractures Involving Larger Bones."

1904. William H. Welch, M.D., LL.D., Professor of Pathology, Johns Hopkins University, Baltimore. "Infection and Immunity."

1905. Sir Patrick Manson, K.C.M.G., F.R.S. "Tropical Diseases."

1906. John C. McVail, M.D., D.P.H., Cambridge, Glasgow. "Practical Hygiene, Epidemics and Preventive Medicine."

1910. Reginald Heber Fitz, M.D., LL.D., Hersey Professor of Theory and Practice of Medicine, Harvard University, Boston. "A Consideration of Some Features of the Lymphatic System."

1911. E. Fuchs, Professor of Ophthalmology, University of Vienna. "Importance of Ophthalmology in Its Relation to Systemic Disease."

1913. Edward Albert Schaefer, Professor of Physiology, University of Edinburgh. "Internal Secretion."

FOREIGN

Grants for Scientific Research.—The Austrian Academy of Sciences has given Prof. Wagner v. Jauregg $1,250 to finance further his research on the etiology of goiter; Professor Honigschmid of Prague was also given a grant of $613 to continue his studies of the atomic weight of the radium elements, and Professor Netolitzky of Czernowitz $375 to continue his study of the history of foodstuffs.

Prophylaxis of Plague in Italy.—The authorities at Naples have ordered that in view of the fact that various ports in the basin of the Mediterranean have lately become foci of bubonic plague, all ships must take strict precautions and use guards, etc., to prevent rats getting ashore from the ships. None can anchor less than 5 meters from the dock.

Comparison of Casualties at Football and Bull-Fights.—The *Medicina Contemporanea* of Lisbon, November 15, quotes a Spanish daily which compares the casualties during the last three months at football in the American university teams (fourteen dead and 175 injured) with the casualties at the bull-fights in Spain during the same period. "The bull-fights make a better showing, and it is still better," our exchange adds, "when we consider that football often entails a predisposition to lung and heart disease."

Deaths in the Profession Abroad.—The death is reported of Prof. Charles Périer of Paris, president of the Académie de Médecine, aged 78.——The cable reports the death of Alfred Fournier, one of the leading syphilologists of the world, aged 82, professor of dermatology and syphiligraphy at the University of Paris from 1863 until he reached the age limit. To the medical mind, "Fournier" spells "syphilis," as his works have been the text-books for more than one generation, and his methods were long the basis of treatment in all civilized countries.

WAR NOTES

Red Cross Seals in Germany.—Red Cross seals are being sold extensively in Germany. There is both a five- and a ten-pfennig seal.

Woman Physician Decorated for Bravery.—The *Deutsche medizinische Wochenschrift* states that the wife of the Vienna surgeon, A. Lorenz, accompanied him to the front as his assistant, and has recently been decorated by the emperor, receiving the gold Order of Merit with crown and the bravery medal.

Human Documents from the War.—The stories told by the wounded soldiers who have been cared for at the Charité hospital at Berlin form an interesting little volume of adventures and experiences — *Kriegsdokumente* — which is being sold by the G. Thieme firm at Leipzig for the benefit of the families of the wounded.

Minor Inconveniences of the War.—In Germany the wounded have frequently been carried past their homes or not carried far enough. The Rhinelanders have been taken far inland, and the Berliners left in the Rhineland, Bavarians taken to northern Germany and so on. The Red Cross has made a vigorous protest against this, and pleaded that the interests of the individual wounded should be regarded more than the train schedules, and the condition is being remedied.

Certain Quack Advertisements in Berlin Forbidden During the War.—The authorities have decreed that as long as the war lasts no newspaper or periodical published in Berlin or the province of Brandenburg is to be allowed to publish the advertisements of persons claiming to cure what are generally known as venereal diseases or their consequences or advertisements of articles or methods of treatment directed to the relief or cure of such. The decree does not apply to regularly registered physicians.

Medical Students at the Front.—Emergency examinations have been held in Germany to permit students who had nearly completed their medical course to take up active duty. The *Medizinische Klinik* states that about 2,250 medical students have thus blossomed out as physicians, and all but 750 have been distributed among the land and sea forces. The total number of physicians in the German empire has thus been summarily increased by about 7 per cent. The regular examinations will have to be taken later.

Medical Meetings at the Front.—The German army surgeons at various points at the front gather once or twice a week for general discussion, and the reports of these informal "army-medical evenings" are published regularly in our German exchanges. Especially in Belgium, the German and Belgian physicians gather frequently for these professional "smokers." In the home zone the meetings of different medical organizations are generally merged into one meeting, as there are so many gaps in the ranks.

Alcohol Among the Soldiers.—The prohibition of alcohol among the German troops has been partly lifted, as it was realized that the cold and damp bringing on intestinal trouble in many soldiers caused them to long for the transient warmth and subjective relief afforded by a drink of liquor. So it was decreed that if, under such circumstances, liquor was to be allowed the men it should be in the form of red wine. The temperance movement in the army, the authorities reaffirm, will otherwise be promoted in every way.

Committee to Aid Belgians.—An appeal made by Dr. Charles Jacobs of Brussels for aid for civilian physicians, pharmacists and patients in Belgium, has resulted in the organization of a committee of American physicians for the purpose of aiding those requiring help. The Commission for Relief in Belgium will deliver supplies, and in order to insure quick delivery it has been arranged that all shipments by the Committee of American Physicians will be made in boxes painted yellow. The color scheme adopted is designed to facilitate the safe passage of articles across the sea and through various countries. Subscriptions to the fund should be sent in the form of a check or postal order, made payable to Dr. Frank F. Simpson, treasurer, 7048 Jenkins Arcade Building, Pittsburgh, Pa.

Contributions to Fund for Belgian Physicians.—Dr. F. F. Simpson, treasurer of the Committee of American Physicians for the Aid of the Belgian Profession, announces that for the week ending December 26, the following contributions have been received: Union Trust Co., banking facilities; Sterrett and Acheson, attorneys, professional services; F. O., $25; F. H. M., $100; F. F. S., $100; S. P., $25; G. C. S., $5; S. A., $20; E. W., $25; B. L., $10; T. E. S., $20; T. L. S., $25; R. S. E., $10; M. W. R., $10; W. A. P., $25; M. C. S., $5. Total, $405.

Deaths in German Army.—In the four weeks ending November 24, the *Münchener medizinische Wochenschrift* had given the names and titles of sixty-seven German physicians or medical students who had died or been killed at the front. Some died from infection contracted in tending the wounded. In the latest compilation, twelve of the forty-two names are listed as "stud. med." or "cand. med.," and most of them as *Kriegsfreiwilliger*, "volunteers." No lists of names are given in the French exchanges received, but some of our German exchanges publish within a laurel wreath the names of the members of the profession who have been wounded or are missing or have fallen or died otherwise at the front, as also all who have been awarded the iron cross for special gallantry under fire.

Quarters for the Wounded in Paris.—The *Presse Médicale* of November 19 gives the official list, with addresses, of the hospitals and other quarters in and around Paris arranged to receive wounded soldiers. Besides the four regular military hospitals and sixty-nine annexes, the Red Cross has 105 auxiliary hospitals, the Women's Union eighty-six, the Association des dames françaises 100, there are the twenty-five regular municipal hospitals and a long list of convalescent homes. The only independent hospitals, that is, under the direct control of the war department, are the English Hospitals with two annexes (one in the Hotel Astoria) and the American Hospital. The various auxiliary hospitals include of course many private residences, schools, colleges, casinos and stores, the Bon Marché, the Magasins du Louvre, the Masonic Temple, club houses and fashionable hotels.

Financial State Aid for Women at Confinement.—The German parliament is now discussing ways and means to provide state aid for women at childbirth. The plan is to supply medical care and obstetric nursing free of charge and also a pension during the eight weeks following, and a small daily sum thereafter as long as the woman nurses her babe, up to the end of the twelfth week after delivery. It is estimated that if this scheme goes through as proposed by the Bundesrat the expense will be about half a million dollars a month. "This expense is justified," the speakers said, "from the standpoint not only of the aid to the head of the house who has been called to the colors and has had to leave his wife unprovided for, but also from the standpoint that the losses in human lives sacrificed in the war make it the imperative duty of the state to care for the coming generation and promote its healthy growth in every way, even from its first entrance on the scene."

Medical Schools Abroad During the War.—Our exchanges mention resumption of the work of the medical schools to some extent, as many of the professors are too old for active

service at the front and are keeping up their courses; but the academic halls are nearly deserted except where they have been converted into hospitals for the wounded. The Italian universities offer hospitality to students from other countries, the *Policlinico* saying that there can be no infringement of the obligations of neutrality in inviting students from other countries, including those from Russia, Servia and Japan, to whom the universities of Germany and Austria are now closed. The editorial deprecates "the prevailing custom of regarding laboratory achievements as the key that opens the door to academic positions. Minute study of some one small subject does not fit a man to be a successful instructor as much as broad culture and a synthetic vision of the whole field and its correlation with the other fields of knowledge." The medical schools in Switzerland have long been frequented by numbers of students from Russia and the Balkan states, and the proportion is still large.

Rye Must Be Mixed with Wheat Flour in Baking Bread in Germany.—According to our German exchanges just received, the decree of the Bundesrat regulating the consumption of flour went into effect December 1. It provides that no bread shall be baked henceforth from pure wheat flour. The bread must contain at least ten parts—by weight—of rye flour to ninety parts wheat flour. Rye bread offered for sale must be made with at least five parts potato flour to ninety-five parts rye flour. The baker can increase the proportion of potato flour if he wishes, but bread with more than five parts potato flour must be marked with the letter "K" (*Kartoffel*, "potato"). If there is more than twenty parts potato flour, the figure must be added to the "K." The feeding of rye and wheat grain or flour to domestic animals is strictly prohibited. Wheat flour is to be sold without admixture of rye. It is left to the baker to do the mixing. The decree specifies that the wheat flour must be bolted at least to 75 per cent. and rye flour 72 per cent. The term bread includes loaves, rolls, etc., but not cake or zwieback. The *Medizinische Klinik* comments on this regulation that "pure" wheat flour is seldom or never met with, as what is offered as such on the market almost invariably contains more or less of other grains. It continues: "The physician will not find that the new regulation interferes with his dietetic management of his patients as, if wheat bread is particularly needed for a patient, he can have it baked in the house or substitute cake or zwieback for loaf bread. The small admixture of rye in the bread or of potato flour in rye bread are of no consequence, it adds, from the medical point of view. What is important is to know that pure wheat flour can be bought as such, and that zwieback and similar light biscuits and cakes for the use of the sick are not affected by the decree which has only the commercial bakeries in view. The carbohydrate proportion, the starch and dextrinized substances in the bread, are not modified by the change, that is to say, there is no modification in the most important elements of the bread from the economic standpoint. There is scarcely any reduction in the elements representing the calorie value of the bread; the modification is almost exclusively in the proportions of the gelatinoid or albuminoid elements and in the proportion of the cellulose refuse. Of the three kinds of flour concerned, wheat flour contains the largest amount of protein and the smallest amount of cellulose, and potato flour the reverse. The bread will, therefore, be poorer in protein and contain more cellulose, but the change is so slight that it is negligible from the economic standpoint."

LONDON LETTER

LONDON, Dec. 11, 1914.

The War

THE EXPLOSIVE EFFECT OF BULLETS

The ghastly effects sometimes produced by the modern rifle bullet, in contrast to the usual small aperture of entrance and exit and rapid healing, is still causing discussion as to the use of explosive bullets. Confusion arises from failure to distinguish between explosive effects produced by a legitimate bullet and the effects of an explosive bullet. That the pointed modern bullet, which differs little in the armies of all the combatants in the present war, may produce under certain conditions explosive effects has been abundantly shown. Mr. G. H. Makins, consulting surgeon to the expeditionary force, points out that these depend on two factors—high velocity and instability in flight—of which the latter is much more important. The effect of the former is principally shown by extensive comminution of bones when struck at a right angle. According to Mr. Makins, the instability of flight and tendency of the bullet to revolve around a transverse axis give it a capacity for wounding the soft part greater than that of any expanding or soft-nosed bullet. Unless impact with the body takes place by almost the exact tip, a rapid revolution of the bullet on its axis occurs and the bullet is driven sideways through the tissues, producing an extensive aperture of exit.

NEUROSES AND THE WAR

A certain number of cases of hysteria, traumatic and otherwise, are being observed in invalided soldiers. They appear to be due to a combination of factors such as fatigue, hunger, strain of responsibility and exposure to repeated explosions. In some cases autosuggestion appears to play a part. Thus a Belgian soldier was hit on the back by a heavy wooden sleeper blown against him by the explosion of a shell. He was knocked down half unconscious from shock and pain, and was brought to this country with paralysis of the left leg which on examination proved to be typically hysteric. In other cases, autosuggestion does not appear to play a part. Thus a British officer strained his right side in carrying a heavy wounded man. Three days later he noticed that he was dragging his right foot and that his right arm was weak. He was found to be suffering from hysteric hemiplegia.

THE OUTBREAK OF TYPHOID FEVER IN BELGIUM AND NORTHERN FRANCE

This outbreak was mentioned in a previous letter. It appears to be due to the drinking of unsterilized water by the Belgian troops. In the area flooded to bar the way of the Germans, the floods have emptied the cess-pits and middens and spread their contents far and wide. Moreover, many corpses are floating in the water. According to the principal medical officer of the Belgian troops, the reports of the outbreak have been exaggerated and there are only 120 cases among the soldiers. However, from twenty to thirty per day arriving at Calais have been reported. A traveler who has returned from a town in the southeast corner of Belgium states that it was being converted into an immense hospital to deal with convalescent typhoid cases, of which 1,600 had already arrived and preparations were being made for 4,000 more. So far there have been very few cases among the British troops—less than 200 in two and one-half months, and of these only five occurred among men who had been properly inoculated against the disease.

HOSPITALS AND THE WAR

By the erection of new hospitals as well as by the extensive accommodation offered in existing hospitals, ample accommodation is being provided for the wounded. To take only one example, the London Hospital has offered as many as 500 beds for the wounded soldiers and sailors, of which only about half have so far been required. This hospital has also under consideration the dispatch to France of a contingent of surgeons, physicians, nurses, dressers, roentgenographers and others sufficient to staff a hospital there. By such an arrangement most members of the hospital staff would be able to take a term of service with the contingent. Should the War Office desire, such a contingent will be immediately forthcoming. The base hospitals in France are well provided with consultants of all sorts. Eminent surgeons, physicians, ophthalmologists, and others have freely given their services. Among the latest are Sir Berkley Moynihan and his assistant, Mr. L. R. Braithwaite, who have gone as consultants in abdominal surgery.

THE EFFECTS OF THE WAR ON CIVILIAN PRACTICE

The war has effects on civilian practice, some of which are curious. There is a great falling off of office work, especially in consulting circles. The reason is that patients who read about the dreadful injuries of war think less of their own ailments. Hysteric and neurotic persons have now something to think about outside themselves. Even in the case of real ailments in which there is no urgency for treatment, such for example as hemorrhoids, patients trouble less about their symptoms and postpone operations. Another factor, no doubt, is the financial stress which leads to curtailment of expenditure. On the other hand, the profession has been financially benefited in some directions. The great demand for army surgeons has caused a falling off in the applications for junior institutional appointments, and increased salaries have to be offered. In one case the salary offered was doubled, and yet the advertisement still appears.

THE WAR AND CRIME

Another curious effect of the war is a great diminution of crime. The earlier closing of saloons, announced in a previous letter to THE JOURNAL, is one of the factors. At the

present sessions of the Central Criminal Court there is no charge of murder or manslaughter. In an interview, a London magistrate has expressed himself as follows: "The criminal is a patriot. There is a genuine feeling of public spirit to be noticed to-day among those whom we call the criminal classes. Not only the graver forms of crime—those attended by violence, for example—but the most casual type of offense is less common than in the time of peace. The same moral improvement of the criminal was noticed—though not in so marked a degree—during the South African War. The criminal, like the honest citizen, is impressed by the war conditions, which make it every man's duty to give as little trouble as possible." The suffragettes have discontinued their agitation, and thus another source of crime is abolished.

THE EFFECTS OF THE WAR ON THE DRUG SUPPLY

This was the subject of discussion at the Pharmaceutical Society. Prof. H. G. Greenish dealt with the question of crude drugs, and expressed the opinion that the number of medicinal plants at present under cultivation in different parts of the British Empire might be very considerably increased. Was it not possible to find a substitute for a drug, the supply of which had been seriously curtailed as a result of the war? Necessity might compel us to search for parallel drugs, and, in the event of such not being forthcoming, to prosecute the cultivation of the drug we required in one of the divisions of the empire, and so render ourselves less dependent on sources of supply that might at such times as the present fail altogether. Mr. J. C. Umney said the action of the government in connection with a drug supply advisory committee in framing an effective schedule of contraband of war had done much to prevent clearance of existing stocks, and so protected the interests of our land and sea forces as well as those of the civil population. The action of the government, by their inquiries and legislative power of acquisition, had leveled prices from the range of fancy to fact in the short space of two or three weeks. Mr. C. A. Hill, referring to the manufacture of synthetic drugs, said we could not expect to build up in a few months an industry which had taken forty years to develop in Germany. One of the great difficulties was that each product depended on others, the raw materials of one synthetic substance being a by-product in the manufacture of another. It would not pay to put down an expensive plant for the manufacture of a few products, the whole consumption of which was only a matter of perhaps hundredweights, but it would pay a factory which could turn out a hundred products each with a consumption of some hundredweights per annum. Mr. F. W. Gamble reviewed the position with regard to serums and vaccines. Since the outbreak of war, large quantities of typhoid vaccines had been supplied to the War Office, and there had been a heavy demand for calf-lymph, antisepsis vaccine and tetanus antitoxin.

Alive After a Fall of 115 Feet

The case of a man who survived a fall of 115 feet furnishes a record. An inquest was held on a builder's signalman who died as the result of the collapse of a derrick staging in a gale. His companion who had fallen 115 feet on to hard concrete survived, and the inquest was adjourned for his attendance.

PARIS LETTER

PARIS, Nov. 19, 1914.

The War

WAR AND INSANITY

It is well known that during the war in Manchuria the number of cases of insanity, especially in the Russian army, were very great. Therefore, at the beginning of the present war, measures were taken to provide against the danger of an outbreak of insanity, and it was agreed that, in view of the probable number of cases, a special asylum should be reserved for all the unfortunates demented by war. Experience has shown that these apprehensions were exaggerated. Cases of insanity caused by the war among civilians or soldiers are very rare at present. They can be divided into four classes: There were, at the outset, some cases of insanity clearly due to alcoholism; also some cases of latent general paralysis which developed under the strain of sudden emotion, and likewise cases of melancholia. What has been feared especially, however, in view of the experience of the war in Manchuria, has been the fourth class of cases —those induced by the inevitable fatigue of the campaign. These fears have not been justified for such cases have been very rare, chiefly because the nutrition and hygiene of the troops are incomparably better than were those of the armies in Manchuria.

THE USE OF TETANUS ANTITOXIN

By order of the minister of war, a commission consisting of Dr. Roux, director of the Institut Pasteur, Dr. Vaillard, medical inspector-general, and Dr. Chavasse, director-general of the sanitary service of the group of armies, has been organized to study the best method of utilizing the available supply of tetanus antitoxin. Since the injection should be made as soon as possible after the wound the commission proposes the following measures:

1. All the ambulances and hospitals near the front and also the sanitary trains shall be supplied in the first place.

2. Delays and losses are to be avoided by sending consignments of serum expressed to their destination.

3. Since wounds of the soft parts rarely cause tetanus, injections of serum are to be made by preference in cases in which wounds affect the bones or are manifestly soiled or contain foreign bodies.

4. Preventive injections are to be given in the ambulance or in the hospital near the front. When, on account of the great number of the wounded, the physicians near the front have not the time to do this, the injections should be made in the more distant hospitals or in the sanitary trains which should always be provided with supplies necessary for dealing with these cases.

5. The application of these measures is to be facilitated by tagging the patient with an individual record slip attached to his clothes in which the physician who made the first dressing shall mention whether or not he has made the preventive injection. This tag is to be carefully preserved.

6. When the physician believes that an infected wound may still be liable to tetanus, he should make a second injection several days after the first and sometimes a third after the second. To avoid the danger of anaphylaxis, it is best to have no longer interval between the injections.

7. In the cases of outspoken tetanus, intravenous, intraspinal or intracerebral injections should be used. The commission recommends that the physician make sure that the patient has never received a therapeutic serum injection (antidiphtheritic, antidysenteric, etc.). If he has, in order to avoid anaphylaxis, Besredka's method of subintrant injections should be followed, that is, the serum should be diluted to one-tenth strength and 1 c.c. injected into a vein; four minutes afterward, 3 c.c.; two minutes afterward, 5 c.c.; fifteen minutes afterward, pure serum either into the vein or into the spinal canal.

8. The commission emphasizes that strict and immediate antisepsis of wounds is one of the best means of avoiding tetanus.

THE PROPHYLAXIS OF TYPHUS IN THE ARMY IN THE FIELD

Dr. Charles Nicolle and his collaborators of the Institut Pasteur de Tunis have shown by experiments confirmed by American physicians in Mexico (THE JOURNAL, March 23, 1912, p. 873, and April 20, 1912, p. 1198) that lice are the agents of the propagation of exanthematic typhus. The prophylaxis of typhus based on this important discovery has given very remarkable results. Typhus, which was endemic in Tunis and which has claimed a large number of victims among the native population each year, has almost completely disappeared. The number of cases, which was 836 in 1909, fell to 22 in 1912. The only measure taken was a systematic destruction of lice about the patients and in their environment.

November 9, Professor A. Laveran, before the Académie des sciences, called attention to the special interest of these facts to-day. Exanthematic typhus is par excellence a disease of armies in the field. It was formerly called "camp-fever," "malignant fever of armies" and "war plague." The list of deadly epidemics of typhus which have raged among armies in the field, is a long one. Thus, during the Crimean War (1855-1856) typhus made great ravages among the French and English armies. The soldiers, for protection against the cold and the projectiles of the enemy, dug themselves covered pits where contagious diseases spread with great facility. To-day, because of the progress in artillery, the use of trenches has become general. During the great battles of the Marne and the Aisne, trenches, covered or not, took on such importance that these battles are justly compared to sieges. Now, that the winter is coming on, the tendency of the soldiers to shut themselves up in molehills, as it were, is possibly increasing and if the germ of typhus were to be imported into the army, it might give rise to a

disastrous epidemic. Is this importation possible? Laveran replies that it is, for exanthematic typhus has long been endemic in certain German provinces, especially Silesia. The treatment of phthiriasis in the soldier is always a necessary measure of cleanliness and hygiene. Under present conditions, it is the most efficacious measure that can be taken against exanthematic typhus.

SURGICAL INTERVENTION IN LESIONS OF THE NERVE TRUNKS OF THE LIMBS BY MILITARY PROJECTILES

November 10, Dr. Walther, *agrégé* professor at the Faculté de médecine de Paris and surgeon to the hospitals, read an interesting paper on this subject before the Académie de médecine. At the military hospital of Val-de-Grâce, Walther observed, in 502 wounded patients, twenty-seven cases of lesions of the nerve trunks, eighteen in the arm and nine in the leg. He operated in six cases. Generally, the anatomic lesions demonstrated during operation consisted of a very sharp compression of the nervous trunk by a thick solid mass of very hard cicatricial tissue much larger than would be supposed from the dimensions of the cutaneous scar. Indication for operation is often established by the intensity of pains. The operation can be performed very early, even before the complete cicatrization of the cutaneous wound if a large resection of this wound and the subjacent cicatricial tissue is made. When there is complete paralysis without pain, it is better to wait for the cicatrization of the wound, but if then no tendency to improvement under medical treatment is observed, it is better to operate early in order to avoid the aggravation of the lesions by compression from the retraction of the deep cicatrix. The operation is usually laborious. Walther recommends bathing the nerve constantly during the operation with warm isotonic, physiologic saline solution. An important feature of the operation consists in building up, above and below the nerve, two planes of normal tissues so as to avoid all probability of retraction of cicatricial tissue. This may almost always be done by adjusting a slip of neighboring muscle tissue, maintaining it in place by suture on the edge which does not pull on the nerve. The defect in the skin resulting from removal of the cicatrix may be very large and should be repaired by autoplasty so that the whole region is covered anew with supple and mobile tissue.

The results of these operations have been very satisfactory; the pains have disappeared immediately, though they generally reappear momentarily during the following days much attenuated and of different characters; they cease completely after ten or fifteen days. In a case of paresis from compression of the median nerve, complete reestablishment of mobility was obtained at the end of twenty days. There has been no functional improvement as yet in the three cases of total motor paralysis.

PARIS, Dec. 3, 1914.

HOSPITALS FOR SOLDIERS OF THE BELGIAN ARMY AND FOR COLONIAL SOLDIERS

A hospital of 200 beds for wounded Belgian soldiers, forming a complete separate service having its own entry, is to be installed at Paris at the Hôtel-Dieu. The great halls of the ground floor will hold the dressing-rooms and the storerooms, also a workshop for the preparation of warm clothes for the convalescents leaving the hospital. The wards for patients, officers' rooms, and the isolation-rooms will be on the two floors above. The medical and nursing staffs will be entirely distinct from those of all other institutions. At the entry will be placed a tablet bearing the inscription "Military Hospital Albert I Created by the City of Paris for the Wounded Soldiers of the Belgian Army." The court of honor will bear the name of "Court of Queen Elizabeth." The rooms of the hospital will be called by the names of Belgian cities: Brussels, Liége, Antwerp, Louvain, Malines, Namur, Dinant, Bruges, Ghent, Ostend, Nieuport, Dixmude, Ypres and Furnes.

Our wounded colonial soldiers are at present widely scattered. Placed among Europeans whose language they do not know, deprived of news of their families, with whom, since they do not know how to read or write, they cannot correspond, these soldiers are rapidly affected with melancholia, and physicians state that this mental attitude has a bad effect on their convalescence. It was thought that by placing these men together and facilitating the receipt of collective news from their homes, these disadvantages would be obviated to some extent. The installation of a special hospital for wounded colonial soldiers has therefore been proposed.

PRESERVED MEATS FOR THE ARMIES

November 23, Dr. Roux, director of the Institut Pasteur, read a paper before the Académie des sciences on means of preparing preserved meat for the armies, especially for the entrenched camp of Paris. The operation consists in placing in metal cans, 800 gm. of raw meat cut into pieces, 50 gm. of rice, 10 gm. of salt and 2 gm. of agar-agar. The cooking is done in an autoclave in three hours and the cans are then sealed. Dr. Roux admits that the method officially sanctioned by the war department is preferable, but it is also less expeditious, and speed is an important element under the present circumstances.

ANTITYPHOID VACCINATION IN THE NAVY

The minister of marine has just addressed to naval officers a circular letter making antityphoid vaccination obligatory in the navy, as it already was in the army. Vaccination is not to be performed on men protected by a previous attack of typhoid, those who present contra-indications, those who are to be on active duty immediately, or those who cannot be kept in one place for a sufficient length of time to permit the application of the entire course of treatment.

AID FOR THE STUDENTS OF LILLE

The vice-rector of the Académie de Paris has informed the dean of the Faculté de médecine de Paris that he may, at the request of students of the Faculté de médecine of the Université de Lille, authorize them to follow provisionally without payment of fees, the work corresponding to their year of studies and to use the library up to the time until they are able to resume their studies in Lille.

PROHIBITION OF ABSINTHE IN THE COLONIES

A decree has just forbidden the introduction, manufacture, sale or possession, for personal use or for sale, of absinthe and the similar liquors throughout the colonies and territories of western French Africa.

THE SALE OF THE RED CROSS STAMP

I mentioned in a previous letter (THE JOURNAL, Oct. 31, 1914, p. 1591) the creation of a special 15 centime (3 cents) postage stamp one-third of the price of which goes to the Red Cross. The sale of this stamp had realized, up to October 1, 120,000 francs (about $24,000). Still larger sales are hoped for.

TWO NEW HOSPITAL SHIPS

The Société générale des transports maritimes has decided to transform two of its boats, the *Aquitaine* and the *Boukkala*, into hospital ships. The society defrays all the expenses. One hundred and thirty beds are placed on the spar deck, which is arranged as a dormitory. The poop has been made into a refectory. The medical and nursing staff is lodged in the cabin. The two boats are now ready to receive wounded.

THE ACADEMY OF MEDICINE ON THE SUBJECT OF THE PROHIBITION OF ALCOHOL

November 24, the Académie de médecine unanimously voted its approval of the action of the czar of Russia in forbidding the manufacture and sale of alcoholic drinks.

PERSONAL

Among the numerous members of the medical profession who have received the decoration of the Legion of Honor for their practice in the war are Dr. Proust, agrégé of the Faculté de médecine de Paris and surgeon of the hospitals and Dr. Victor Pauchet, professor at the Ecole de médecine d' Amiens. The former was mentioned in an order of the day for having displayed remarkable devotion and energy in the organization of sanitary service August 22-26, and, for operating on the wounded under the fire of the enemy. Dr. Pauchet was decorated with the following official mention: "A surgeon of great scientific renown who, by his inexhaustible activity and devotion above all praise has under the most difficult circumstances saved the life of a great number of dangerously wounded."

Death of Dr. Léon Vaillant

Léon Vaillant, doctor of medicine and of sciences, has just died in Paris, aged 80. He was formerly professor at the Faculté des sciences de Montpellier and honorary professor of the Museum of Natural History at Paris, and member of various scientific societies.

Marriages

REMBERT JAMES CONEY, M.D., Eutawville, S. C., to Miss Daisy Katherine Minahan of Charleston, S. C., at Orangeburg, S. C., December 15.

KARL OSTERHAUS, M.D., Washington, D. C., to Miss Elizabeth Oxley Currie of Winslow, N. S., at New York City, December 2.

ROBERT HAMILTON BISHOP, JR., M.D., Saranac Lake, N. Y., to Miss Constance Mather of Cleveland, Ohio, December 5.

ALFRED MAGNUS KENDAHL, M.D., Jasper, Minn., to Miss Lillian Rosina Natzke of Pipestone, Minn., December 12.

ARTHUR FLOURNOY JACKSON, M.D., to Miss Margaret Christy Tupper, both of Honolulu, H. I., November 20.

JUNIUS HARDIN MCHENRY, M.D., New York, N. Y., to Miss Amy DuPuy of Pittsburgh, Pa., December 5.

CHARLES HARLAND DOWNING, M.D., to Miss Lillian E. Marryatt, both of Everett, Mass., December 10.

ROSCOE EARL HAMLIN, M.D., Santa Rosa, Cal., to Miss A. Carmen Mouritz of Oakland, Cal., December 9.

HARVARD HERSEY CRABTREE, M.D., Bangor, Maine, to Miss Constance M. Newell of Boston, December 2.

WILLIAM HENRY HAINES, M.D., Pittsburgh, to Miss Mabel Estelle Bemis of Warren, Pa., December 9.

ARTHUR COLUMBIA PEARMAN, M.D., to Miss Katherine Keeler, both of Rockford, Ill., December 12.

JOHN LYMAN BEARD, M.D., Hillsboro, Cal., to Miss Clarice Pierson of Martinez, Cal., December 25.

CHARLES ROBERT AUSTRIAN, M.D., to Miss Florence Hochschild, both of Baltimore, December 9.

LE ROI GODDARD CRANDON, M.D., Boston, to Mrs. Lucy E. Gill, in New York City, December 15.

WALTER EDGAR BARBOUR, M.D., Seville, Ga., to Miss Leake Clark of Atlanta, Ga., December 15.

CUVIER L. CLOVER, M.D., to Miss Freda Trainer Moore, both of Knox, Pa., December 21.

SOLOMON A. WEISS, M.D., to Miss Gertrude Marblestone, both of Chicago, December 6.

J. H. MCKINNEY, M.D., Fulton, Ark., to Miss Cora Holthoff of Dumas, Ark., recently.

Deaths

Albert Freeman Africanus King, M.D. George Washington University, Washington, D. C., 1861; University of Pennsylvania, Philadelphia, 1865; a Fellow of the American Medical Association; professor of obstetrics and diseases of women and children in his Alma Mater, from 1871 to 1913, and dean of the institution from 1879 to 1894; professor of obstetrics in the University of Vermont, Burlington, from 1871 to 1913; president of the Washington Obstetrical and Gynecological Society, from 1885 to 1887, and of the Medical Society of the District of Columbia in 1883-84; acting assistant surgeon, U. S. Army in 1864; author of a manual of obstetrics; died at his home in Washington, December 13, from senile debility, aged 73. In tribute to Dr. King's memory the George Washington Medical School was closed on the day of his funeral.

Benjamin W. Smock, M.D. Hospital College of Medicine, Louisville, 1889; a Fellow of the American Medical Association; for twenty years health officer of Jefferson County, Ky.; sanitary inspector of the State Board of Health and a commissioner of the Lakeland State Hospital; aged 54, who had been in ill health for a long time; died at his home in Louisville, December 16, from the effects of an incised wound of the throat, self-inflicted, it is believed, with suicidal intent, while of unsound mind.

James Delaforet Whitley, M.D. Rush Medical College, 1874; a member of the Illinois State Medical Society and a Fellow of the Royal Microscopical Society of London; a veteran of the Civil War in which he served in the Hospital Corps; local surgeon of the Chicago and Alton Railroad; medical health officer of Petersburg, Ill., for sixteen years; died at his home in that city, December 12, aged 70.

Louis Kolipinski, M.D. Georgetown University, Washington, D. C., 1883; a Fellow of the American Medical Association and a well-known practitioner and pharmacist of Washington; resident physician to the Children's Hospital and professor of surgery in the National University Medical College; died in a street car in Washington, December 15, from cerebral hemorrhage, aged 55.

Frank McWilliams, M.D. University of Pennsylvania, Philadelphia, 1899; a member of the Medical Association of the State of Pennsylvania and of the National Association for the Study and Prevention of Tuberculosis; for many years a member of the staff of St. Joseph's Hospital, Reading, Pa.; died at his home in Schuylkill Haven, Pa., December 16, from pneumonia, aged 40.

Winfield Scott Smith, M.D. Boston University School of Medicine, 1883; professor of operative surgery in his Alma Mater; and surgeon to the Massachusetts Homeopathic and Symmes hospitals, Boston, Arlington City Hospital, Quincy Hospital and Leonard Morse Hospital, Natick, Mass.; died at his home in Brookline, Mass., December 16, aged 53.

William H. Carter, M.D. Barnes Medical College, St. Louis, 1896; of Poolville, Tex.; formerly secretary of the Medical Board of Examiners for the forty-eighth Texas district; physician of Tarrant County, Tex., and a member of the staff of the Tarrant County Hospital; was shot and killed in Poolville, December 15.

Charles William Trueheart, M.D. Medical College of Virginia, Richmond, 1864; who was made an honorary member of the Bexar County (Texas) Medical Society in 1914; a Confederate veteran; for many years city health officer of Galveston, Texas; died at his home in San Antonio, Texas, December 14, aged 77.

Frederick Lewis Foster, M.D. Hahnemann Medical College, Chicago, 1900; a Fellow of the American Medical Association; city physician of Fond du Lac in 1903; a specialist on diseases of the eye, ear, nose and throat; died at his home in Fond du Lac, December 10, from pneumonia, aged 41.

Alexander J. Mitchell (license, Kentucky, 1881). For forty-three years a practitioner of Wirt County, W. Va.; and for several terms a member of the legislature; a member of the state mine commission; died at his home in Burning Springs, W. Va., December 9, from heart disease, aged 69.

Robert S. Talbot, M.D. Medical College of Virginia, Richmond, 1902; formerly of Lynchburg and Richmond, Va.; a member of the staff of the Central State Hospital, Petersburg, from 1903 to 1906; died at the Retreat for the Sick in Richmond, December 10, aged 37.

James S. McCorkle, M.D. University of Nashville, Tenn., 1860; a surgeon in the Confederate army during the Civil War and for more than thirty years a practitioner of Arkansas; died at his home in Fort Smith, December 11, from disease of the bladder, aged 79.

Ella Averill Patterson, M.D. Woman's Medical College of Pennsylvania, Philadelphia, 1901; who did heroic service at her home city, Butler, Pa., during the recent epidemic of typhoid fever; died at the home of her mother in Philadelphia, December 17, aged 36.

William H. Turkopp, M.D. Starling Medical College, Columbus, Ohio, 1879; for twenty-five years a practitioner of Yankton, S. Dak., but for the last ten years a resident of Columbus, Ohio; died at his home in that city, December 9, from nephritis, aged 59.

Frank Leslie Stallings, M.D. Kentucky School of Medicine, Louisville, 1901; a Fellow of the American Medical Association; died at his home in Lindsey, Cal., December 12, from septicemia, two days after an operation for abscess of the arm, aged 53.

Addison H. Bowser, M.D. Western Reserve University, Cleveland, 1885; a member of the Medical Society of the State of Pennsylvania and formerly a practitioner of Reynoldsville; died in the Warren (Pa.) State Hospital, December 8, aged 52.

John Wiebly Bealor, M.D. Washington University School of Medicine, Baltimore, 1876; a member of the Medical Society of the State of Pennsylvania; died at his home in Shamokin, December 11, from cerebral hemorrhage, aged 60.

William Higginbotham, M.D. Queen's University, Kingston, Ont., 1871; for many years a practitioner of Omemee, Brantford and Walker, Ont.; died at the home of his daughter in Brantford, December 15, aged 66.

John A. Dix, M.D. Eclectic Medical Institute, Cincinnati, 1871; a pioneer practitioner of Whitman County, Wash., and a veteran of the Civil War; died at his home in Garfield, Wash., December 9.

Henry Garrett Voorhees De Hart, M.D. College of Physicians and Surgeons in the City of New York, 1873; of White Plains, N. Y.; for many years a member of the staff of the White Plains Hospital; died in that institution, December 13, aged 65.

Samuel Livingston Howard, M.D. Cincinnati College of Medicine and Surgery, 1874; for many years a practitioner of Ghent, Carroll County, Ky., and cashier of the Ghent Deposit Bank; died in the Jewish Hospital, Louisville, December 14, aged 67.

James F. Thompson, M.D. Jefferson Medical College, 1864; a member of the Medical Society of the State of Pennsylvania; secretary and director of the Perry County National Bank; died at his home in Liverpool, Pa., December 5, aged 72.

Zachary T. Standly, M.D. Rush Medical College, 1870; a member of the Missouri State Medical Association and a well-known practitioner and banker of Laclede, Mo.; died at his home in that place, December 14, from heart disease, aged 67.

Edward Eckerson, M.D. University of Buffalo, 1877; a member of the Colorado State Medical Society and for nearly twenty-five years a resident of Denver; died at his home in that city, from cerebral hemorrhage, December 14, aged 61.

John J. Chambers, M.D. College of Physicians and Surgeons, Baltimore, 1884; formerly of Portland, Ore., but for fourteen years a practitioner of Nome, Alaska; died in the Morningside Sanitarium, Portland, Ore., December 5, aged 55.

John Brazelton F. Dice, M.D. Bellevue Hospital Medical College, 1885; a Fellow of the American Medical Association and a well-known practitioner of Tennessee; died at his home in Morristown, Tenn., December 15, aged 58.

Robert Liggett McGrew, M.D. Bellevue Hospital Medical College, 1886; for many years a member of the staff of the Allegheny General Hospital; died at his home in Northside, Pittsburgh, recently, aged 54.

William H. Vermillion, M.D. Eclectic Medical Institute, Cincinnati, 1877; of Bigelow, Ark.; a member of the Arkansas Medical Society; died in Little Rock, Ark., December 11, from heart disease, aged 71.

Clarence Howard Hagmeier, M.D. Western Pennsylvania Medical College, Pittsburgh, 1913; of Reinhold's Station, Pa.; died in St. Joseph's Hospital, Reading, December 15, from septicemia, aged 28.

Montfort Scott Chenoweth, M.D. Missouri Medical College, St. Louis, 1890; of Kansas City, Mo.; died from cerebral hemorrhage in the Kansas City General Hospital, December 17, aged 53.

Tillman Richard Trotter, M.D. University of Nashville, Tenn., 1858; a member of the Mississippi State Medical Association; died at his home in Winona, Miss., December 9, aged 79.

Edward W. Myers, M.D. University of Maryland, Baltimore, 1862; a pioneer practitioner of Leavenworth, Kan.; died at his home in Kansas City, Mo., December 14, aged 77.

Edward P. Ward, M.D. Berkshire Medical College, Pittsfield, Mass., 1845; a practitioner of Chicago for many years; died in a sanatorium in Kenosha, Wis., December 18, aged 91.

Llewellyn Brock, M.D. Victoria College, Coburg, Ont., 1862; honorary president of the Guelph Society; died at his home in Guelph, Ont., December 11, from pneumonia.

Roland Hocking Gilman, M.D. Medico Chirurgical College of Philadelphia, 1914; of Williamsburg, Pa.; died in Reading, Pa., December 17, from pleuropneumonia, aged 26.

George A. Sively, M.D. Vanderbilt University, Nashville, Tenn., 1899; was found dead in his room in Milton, W. Va., December 6, it is believed from heart disease.

Thomas Wilfred Flood, M.D. Baltimore University School of Medicine, 1902; died at his home in Haverhill, Mass., December 16, from typhoid fever, aged 31.

Willis J. Arnold, M.D. Tulane University, New Orleans, 1870; of Dyersburg, Tenn.; died at the home of his daughter in Memphis, Tenn., December 2, aged 69.

Thomas J. Dewberry, M.D. Atlanta (Ga.) Medical College, 1885; died at his home in Macon, Ga., December 14, from cerebral hemorrhage, aged 52.

William H. Evans, M.D. Charity Hospital Medical College, Cleveland, Ohio, 1866; died suddenly in his home in Ripley, Ohio, December 11, aged 80.

The Propaganda for Reform

IN THIS DEPARTMENT APPEAR REPORTS OF THE COUNCIL ON PHARMACY AND CHEMISTRY AND OF THE ASSOCIATION LABORATORY, TOGETHER WITH OTHER MATTER TENDING TO AID INTELLIGENT PRESCRIBING AND TO OPPOSE MEDICAL FRAUD ON THE PUBLIC AND ON THE PROFESSION

ARTICLES REFUSED RECOGNITION

Reports of the Council on Pharmacy and Chemistry

[Below appear abstracts of the Council's action on articles refused recognition which were not deemed of sufficient importance to require a lengthy report. Articles with the titles starred will be printed in full in the Reports of the Council on Pharmacy and Chemistry for 1914. A reprint of any of these unabridged reports will be sent on receipt of a two cent stamp. Previous instalments of abstracts appeared in THE JOURNAL, Nov. 14 and 21, and Dec. 12, 1914.]

Bannerman's Intravenous Solution

Bannerman's Intravenous Solution (Wm. Bannerman and Co., Chicago) was refused recognition because vague, indefinite and misleading statements were made regarding its composition, because it was recommended for anemia, tuberculosis and syphilis under grossly exaggerated and unwarranted claims and because the intravenous injection of complex and indefinite mixtures is unscientific and dangerous. Notice of the action of the Council having been sent to the Bannerman Company, the firm submitted a revised statement of composition and also a revised advertising circular.

The claim is made that Bannerman's Intravenous Solution "is a compound of only the purest and proven efficient U. S. P. drugs." According to the latest statement:

Each 10 c.c. of Bannerman's Solution contains:

Hydrargyri Albuminas			
Mercury Content	1	1-9 Gr.	or 0.075 Gm.
Ferri Albuminas			
Iron Content	4	1-4 Grs.	or 0.286 Gm.
Sodii Chloridum	6	1-5 Grs.	or 0.412 Gm.
Calcii Salicylicum	4	Grs.	or 0.26 Gm.
Guaiacol	4	Grs.	or 0.26 Gm.
Creosote (Beechwood)	5	Grs.	or 0.32 Gm.

The solvent is said to be distilled water.

The formula is unsatisfactory in several particulars. The stated amounts of some of the ingredients are in excess of their solubility in water; the nature and amount of albumin contained in the "Hydrargyri Albuminas" and "Ferri Albuminas" are not given; the claim that the solution contains only U. S. P. drugs is not true. But the main objection to the preparation is its unscientific character and the unwarranted therapeutic claims made for it.

Even though a patient had all three diseases, syphilis, tuberculosis and anemia, it would be most irrational to use a shotgun prescription, containing, in fixed unvarying proportions, mercury for the syphilis, iron for the anemia and germicides for the tuberculosis. In syphilis the mercury-content of Bannerman's Solution is inadequate; in anemia the intravenous administration of iron is unwarranted, and in tuberculosis there is no evidence that the injection of bactericides is efficient.

Exception must be taken, moreover, to the statement that "its use is absolutely safe." The danger of anaphylaxis from repeated injections of albuminates cannot be disregarded, and as J. F. Anderson, director of the Hygienic Laboratory, has pointed out[1] we know little of the secondary or remote effects of the intravenous injection of toxic substances; some of them probably do permanent harm.

Such claims as the following require no comment:

"It builds up and increases the hemoglobin in the blood.
"It increases the number of red blood corpuscles.
"It regulates the white cells.
"It stimulates cell growth; therefore, it is reconstructive.
"It is a powerful antiseptic.
"It is useful in any septic condition."

In view of the facts given, the Council again refused recognition to Bannerman's Intravenous Solution.

1. THE JOURNAL A. M. A., July 4, 1914, p. 1.

V. 191

Prunoids

Prunoids are tablets put out by the Sultan Drug Company, St. Louis. They are said to be:

"Made of Phenolphthalein (one and one-half grains in each), Cascara Sagrada, De-emetinized Ipecac and Prunes."

The following report on the composition of Prunoids is submitted by the Association's Laboratory:

"From an examination of Prunoids it is concluded that the amount of cascara or extract of cascara in the preparation is very small. Also the quantity of "de-emetinized ipecac" is insignificant. The claim is made:

"The levulose of prunes, a constituent of Prunoids, is hygroscopic and thus when brought into contact with the saliva of the mouth or contents of the stomach, disintegrates and prompt medication is insured."

"Actually the amount of prunes which may be present in Prunoids is negligible. For all practical purposes, therefore, Prunoids are phenolphthalein."

According to the information included on and in the box Prunoids are

"An Ideal Laxative, Purgative, and Intestinal Tonic" . . . "particularly adapted to the treatment of constipation . . ."

They are said to act as an "intestinal tonic"—a claim which in the light of the examination is obviously unwarranted—and because of this it is said that they:

"Will permanently remove constipation without causing after constipation."

The trade package assures the purchaser that Prunoids are:

"Recommended by Physicians Generally."

A circular sent to physicians makes the unwarranted claim that Prunoids are "especially serviceable" in ". . . Neurasthenia, Jaundice, Chlorosis, Rheumatism, Gout . . ." and that

". . . their success in gouty diathesis and vague rheumatic symptoms tends to confirm the opinion expressed by some physicians that they have a solvent action on uric acid."

In the following the haphazard and ill-considered use of purgatives is suggested:

"For the expectant mother, or in the treatment of female diseases, for bowel elimination, no happier or *safer* selection can be made."

The Council refused recognition to Prunoids because, the statement of composition is incomplete and therefore meaningless; because unwarranted therapeutic claims are made for them; because the name "Prunoids" gives the false impression that they depend on prunes for their effect; and because it is irrational and a detriment to medicine to disguise a well-known drug by means of a misleading name and to attempt to create the impression of special virtues by combining it with superfluous drugs.

Sedobrol "Roche"

Sedobrol, put out by the Hoffmann-LaRoche Chemical Works, New York City, is said to contain "17 grains Sodium Bromid, 1.5 grain common salt, fat and seasoning," and to furnish, "on solution in hot water, a very palatable Bouillon." The following report on Sedobrol was submitted to the Council by a member of the Committee on Therapeutics and after discussion endorsed by the Council:

In the opinion of the referee such a preparation of sodium bromid is an unessential modification or combination of official drugs. The advertising literature advocates its use for "stage-fright" and for "arteriosclerosis," both ridiculous suggestions, and the further preposterous statements are made:

". . . small quantity of chlorid present lessens the risk of anaphylaxis [in nephritis] when the ordinary diet is resumed."

". . . it is . . . suitable for administration to discriminating patients who may be averse to taking drugs. The psychic effect of the hot cup of bouillon in neurotic cases may be useful in certain conditions."

The foregoing quotations make it evident that a large dose of bromid is to be employed in the guise of a "cup of bouillon" and the name of the preparation further carries out this deceit. This means encouraging self-medication with a powerful and dangerous drug.

"Sedrobrol 'Roche' gives a savory flavor to unsalted soups. Vegetables, roasts, farinaceous foods, etc., cooked without salt, can be made perfectly palatable by employing for the purpose a strong solution of Sedobrol 'Roche', 1-3 tablets to 4 ozs. of hot water, as a sauce or gravy."

In other words, in a salt-free diet these large doses of bromids are urged as a substitute for chlorids, simply to flavor the food! A more reckless method of medication has rarely been advertised, for the recommendations for the use of this "flavoring" are not limited to the use of epileptics. The claim that this preparation has increased the number of cases of cure in epilepsy is preposterous on its face.

The referee recommends that Sedobrol "Roche" be refused recognition because it is unscientific, because of exaggerated and misleading therapeutic claims and because its use is likely to mislead both patient and physician into useless and pernicious medication.

Echtisia, Ecthol and Echitone

Echtisia (Wm. S. Merrell Chemical Co.), Ecthol (Battle and Co.) and Echitone (Strong, Cobb and Co.) are proprietary preparations each of which is alleged to contain echinacea as its chief constituent. In 1909 the Council examined into the claims made for echinacea. This drug has been claimed to be a "specific" for rattlesnake bite, syphilis, typhoid fever, malaria, diphtheria and hydrophobia. Enthusiasts had credited it with equally certain curative effects in tuberculosis, tetanus, and exophthalmic goiter and with power of retarding the development of cancer. Of course there is no reliable or trustworthy evidence to substantiate these claims. Echinacea is not often prescribed under its own name, but is employed as an ingredient in proprietary preparations mixed with other little-used or obsolete substances. Thus Echtisia is said to contain echinacea, wild indigo, arbor vitae and poke root; Ecthol, to have echinacea and arbor vitae; Echitone, to consist of echinacea, pansy and blue flag. Naturally the manufacturers of such proprietaries make use of all available optimistic reports in promoting their sale, while each manufacturer ascribes special and peculiar virtues to the combination represented in his particular preparation. The Merrell Chemical Company claims that baptisia (wild indigo) is a "destroyer" of devitalizing elements in the blood "a vitalizer of the blood as well"; that thuja (arbor vitae) is a "perfect antiseptic and a generator of vital force in disorganized tissues," and that a long list of diseases, including diphtheria, syphilitic sciatica and gonorrheal rheumatism, "are all more or less amenable to full doses" of phytolacca (poke root). Strong, Cobb and Co. maintain that Iris versicolor (blue flag) is "one of the most powerful excitants of the biliary, salivary and pancreatic secretions," and that the "principal sphere of action of Viola Tricolor [pansy] is in the gastro-intestinal canal and the skin."

There is no satisfactory evidence that the claims for any of these substances are any more reliable than those for echinacea. Notwithstanding, Strong, Cobb and Co. claim for Echitone "not only the virtues of its constituent parts, but a wider field and a particular therapeutic value of its own"; Battle and Co., maintain that Ecthol is the "'Ideal Corrector' of depraved conditions of the fluids and tissues," while the Merrell Company urges the virtues of Echtisia in a list of diseases ranging from acne to appendicitis and from gangrene to rattlesnake bite. The Council refused recognition to these three products and directed publication of reports to call attention to the exaggerated, unwarranted and often utterly absurd claims made for these and similar preparations.

Correspondence

The Juvenile Psychopathic Institute of Chicago

To the Editor:—I venture to call the attention of your readers to the Juvenile Psychopathic Institute of Chicago. Its conception was due to a number of happy influences, its realization largely to the acumen and unselfish work of Miss Julia Lathrop. In April, 1909, the institute was opened, its avowed object being to investigate, to ascertain if possible, the causes of delinquency in children. Naturally, the best field for the work of research was that presented by the Juvenile Court and the Juvenile Detention Home in connection with it, and fortunately the county officials were willing.

My reasons for this communication are:

Medical men should know, first, that such work has been and is being done.

Second, that a large proportion of juvenile "repeaters" (the average age at the institute has been 16 years) are defectives (mentally or physically), epileptics, etc.

Third, they should know something of the practical value of this work. In the beginning the investigation was simply

permitted; but to an intelligent and earnest judge it soon became apparent that the services of a man skilled in the examination of juvenile offenders was of great assistance to him in the adjudication of the cases. Finally, this assistance has become so valuable as to be indispensable. Judge Pinckney, the exceptionally able incumbent of the bench at the Juvenile Court, has averred that he could not go on with his present work without the help of Dr. Healy, who has been the institute's director since the beginning, or some equally efficient aid. So evident has the value of this work become to judiciary, police, attorneys, probation officers, criminologists and sociologists, that emissaries from many cities in this country and Europe have come to observe and have gone home to institute similar bureaus. Seattle was the first to follow us, Boston next, Munich soon after, and now the Municipal Court of Chicago has its own expert.

For five years Mrs. W. F. Dummer and her sisters supported the institute as a private benefaction with public functions, but now Cook County has awakened to its duty and opportunity, and has taken over the institute as an official adjunct of the Juvenile Court. Medical men everywhere should know of and appreciate the importance of this innovation, because,

Fourth, when the opportunity arises for them to assist in the installation of similar officers in their own cities and towns, it is to be hoped that they will earnestly further this step forward in scientific research, common humanity and the administration of justice.

HUGH T. PATRICK, M.D., Chicago.

[An advertisement for a director for the institute appears this week under Announcements, advertising page 20.—ED.]

Postgraduate Study: Facilities in New York

To the Editor:—I did not realize how far Boston is from New York until I read in THE JOURNAL, Dec. 12, 1914, p. 2150, the communication on postgraduate study by Dr. Hugh Payne Greeley of that intellectual center, which is concluded thus: "Let us at once set to work and organize ourselves for this task and give to American physicians practical postgraduate work in *our own* language, and with our own *trade-mark*."

For nearly thirty-three years, there have been actively and successfully engaged in "practical postgraduate work" and in "our own language" and with a distinctly American "trademark," two organizations of well-known medical teachers who have had in attendance on their demonstrations and at their lectures some 50,000 practicing physicians from our own continent and from all over the world.

The New York Polyclinic Medical School and Hospital and the New York Post-Graduate Medical School and Hospital have expended in buildings and equipment approximately $3,000,000, and nowhere in the world can be found better opportunities for a practical postgraduate training and "brushing up" than are afforded by these schools. Over 300 physicians and surgeons are devoting their time to this work, without one dollar of remuneration, and many of these have, in addition, given largely of their means to make postgraduate teaching in America the great success it has proved to be.

May I cite our Bay State brother to an extract from the Boston *Transcript* of Nov. 17, 1914, a paper which may be profitably read by every good American?

"Nor can there be any question that the establishment of the Polyclinic (1881) was the chief stimulus to the advance of medical thought and science in the United States; a stimulus that was felt, not only throughout this country, in all of whose important cities one or more postgraduate medical schools have been founded, but across the sea as well, where the system has been adopted in London and other cities!"

No matter how "tremendous" may be "the impetus to postgraduate instruction on account of the European War," the two great schools of the metropolis are ready for the hoped-for influx and will meet every requirement.

JOHN A. WYETH, M.D., New York.

Provision for Infants in Chicago Municipal Tuberculosis Sanitarium

To the Editor:—In connection with the article of Dr. Alfred F. Hess of New York on "The Neglect to Provide for the Infant in the Antituberculosis Program" (THE JOURNAL, Dec. 19, 1914, p. 2176), I wish to state that the Chicago Municipal Tuberculosis Sanitarium, which is to open its doors about March 1, contains a provision for the new-born infants of tuberculous mothers. A description of this provision was given by Dr. Charles S. Bacon of this city, in his article published in THE JOURNAL, Sept. 6, 1913, p. 750.

The Chicago Municipal Tuberculosis Sanitarium which, with its ultimate capacity of 950 beds, is the largest municipal sanitarium in the country, has a comprehensive provision for children (240 beds for ambulant cases and a special provision for bed cases in the infirmary).

In addition to this the sanitarium has a nursery to which two classes of new-born infants will be admitted: (1) the new-born infants of tuberculous mothers confined in the maternity department of the sanitarium, and (2) the new-born infants of tuberculous mothers remaining at home, who are unable to arrange for safe and proper care of the infant at home.

This is the first arrangement of its kind in the country, and it will no doubt prove of great value in meeting one of the great needs of the tuberculosis situation in a large community. The initial provision in the Chicago Municipal Tuberculosis Sanitarium is for twenty infants, but this will be gradually extended to meet the needs of the situation.

I was very glad to learn from the article of Dr. Hess that this important phase of the tuberculosis situation is in a way to receive due recognition in New York.

THEODORE B. SACHS, M.D., President.
Chicago Municipal Tuberculosis Sanitarium.

Queries and Minor Notes

ANONYMOUS COMMUNICATIONS and queries on postal cards will not be noticed. Every letter must contain the writer's name and address, but these will be omitted, on request.

DENATURED ALCOHOL

To the Editor:—1. By what process is alcohol denatured?
2. Can it safely be used for bathing purposes?

J. G. PETTIT, M.D., Weston, W. Va.

ANSWER.—1. Alcohol ordinarily is denatured according to the following formula: "To 100 parts by volume of 90 per cent. alcohol add 10 parts of approved wood alcohol and one-half of 1 part of approved benzin." In other cases the use of 2 parts of approved alcohol and one-half part of approved pyridin is permitted. Information on this question can be obtained by addressing the Treasury Department, Bureau of Internal Revenue, Washington, D. C.

2. The external use of any alcohol containing wood spirits is unsafe.

REMOVAL OF RUST FROM INSTRUMENTS

To the Editor:—Can you give me a formula for removing rust from instruments?

JAMES M. ADAMS, M.D., Amite, La.

ANSWER.—Instruments can be prevented from rusting in the process of sterilization by adding some sodium bicarbonate to the water in which they are boiled. A good polishing powder may be of aid in removing rust already formed.

LITERATURE ON FUNCTIONAL TESTS OF THE LIVER AND PANCREAS

To the Editor:—I should like to be informed as to the nature and methods of some of the newer tests of the functioning power of the liver and pancreas. These new tests do not seem to be mentioned in any of the newer works on diagnostic tests which I know of. Any information concerning them, or any literature which describes them, will be exceedingly opportune.

R. J. MIDGLEY, M.D., Salt Lake City.

ANSWER.—The following is a list of published articles on this subject:

LIVER

Schirokauer, H.: Alimentary Levulose Blood Test of Functioning of Liver, *Ztschr. f. klin. Med.*, 1913, lxxvii, Nos. 5 and 6; abst., THE JOURNAL, Jan. 3, 1914, p. 83.
Nesbitt, G. E.: Tests for Liver Function, *Dublin Jour. Med. Sc.*, November, 1913.
Rowntree, L. G.; Hurivitz, J. H., and Bloomfield, A. L.: Phenol-tetrachlorphthalein Test of Liver Functioning, *Arch. f. Verdauungskr.*, xix, No. 6.
Arui, T.: Levulose Test of Functional Capacity of Liver, *Deutsch. med. Wchnschr.*, April 16, 1914.
Krumbhaar, E. B.: Present Status of Functional Liver Tests, *New York Med. Jour.*, Oct. 10, 1914.
Chesney, A. M.; Marshall, E. K., and Rowntree, L G: Studies in Liver Function, THE JOURNAL, Oct. 31, 1914, p. 1533.

PANCREAS

Rzasnicki, A., and Landau, A.: Estimation of Pancreas Functioning from Regurgitation of Duodenal Contents in the Stomach, *Ztschr. f. klin. Med.*, 1914, lxxx, Nos. 3 and 4; abstr., THE JOURNAL, Aug. 8, 1914, p. 519.
Matko, J.: Quantitative Test of Pancreas Functioning, *Arch. f. Verdauungskr.*, 1913, xix, No. 6; abstr., THE JOURNAL, Jan. 24, 1914, p. 337.
Piantoni, G.: Tests for Pancreas Functioning, *Policlinico*, July, 1913, Medical Section, No. 7.
Lifschutz, M.: Estimation of Functional Capacity of Pancreas, *Arch. f. Verdauungskr.*, October, 1913; abstr., THE JOURNAL, Nov. 22, 1913, p. 1939.

AUTO ANTIFREEZING SOLUTION

To the Editor:—I want to know the freezing point of denatured alcohol. The question arose while discussing its antifreezing power in comparison with wood alcohol in an automobile radiator. I have no chemistry on that point.

B. J. BILL, M.D., Genoa Junction, Wis.

ANSWER.—We have no information on the freezing point of wood alcohol and water mixtures. Mixtures of denatured alcohol with water are used more frequently because of the lower cost of the denatured alcohol (55 cents per gallon, as against 75 cents per gallon for wood alcohol). A mixture of 1 part denatured alcohol and 3 parts water is said to withstand a temperature of 0 F. A mixture of 3½ parts of denatured alcohol and 6½ parts of water freezes at about 15 F. below zero, and a mixture of 4 parts of denatured alcohol and 6 parts of water freezes at about 25 F. below zero.

FINSEN RED LIGHT IN SMALL-POX

To the Editor:—In Abstract 77, THE JOURNAL, Nov. 28, 1914, p. 1989, is the statement that Würtzen insists that small-pox patients, sheltered against chemical light, as in a Finsen red-light room or in a dark room, do not suffer at all from suppuration and the variola changes its character completely.

It may be of interest to know that a distinguished English physician by the name of Gilbert, teaching at Montpellier at the end of the thirteenth century, insisted that his cases of variola be confined in rooms darkened by red curtains and red hangings, thereby lessening the severity of the disease; preventing suppuration and consequent disfiguration. If I am not mistaken Finsen received the Nobel prize in 1903 for rediscovering this fact.

HENRY F. ALBRECHT, M.D., Green Island, N. Y.

ANSWER.—The Nobel prize was awarded to Finsen for his work in phototherapy, particularly in lupus. The physician referred to is John of Gaddesden, court physician to Edward II. The treatment of small-pox by exclusion of light or by red light is said to have been employed since the time of John of Gaddesden by Picton, Black, Waters, Barlow and others. The red light treatment of Finsen has not been successful in the hands of Welch and Schamberg, Rickets and Byles, Brayton and others. See Schamberg, "Treatment of Small-Pox," in Musser and Kelly's "Modern Treatment," ii, 521.

MEDICAL STUDY FOR WOMEN IN VIENNA

To the Editor:—Please let me know whether women are admitted to medical study and examination in Vienna.

EMIL AMBERG, M.D., Detroit.

ANSWER.—In the chapter on "Medical Education of Women" in the Carnegie Foundation Report, Bulletin 6, 1912, p. 324, these statements are made:

"The most recent statistics for Austria show 80 registered women physicians, as compared with 9 in 1905, 34 in 1908; 39 of the 80 are settled in Vienna."

"Elsewhere, men and women attend the same classes and demonstrations, and, as at Vienna and Paris, dissect at the same tables. Coeducation is the general practice on the Continent."

Medical Education and State Boards of Registration

COMING EXAMINATIONS

ALABAMA: Montgomery, Jan. 5, 1915. Chairman, Dr. W. H. Sanders, Montgomery.

ALASKA: Juneau, Jan. 5, 1915. Sec., Dr. H. C. DeVighne, Juneau.

ARIZONA: Phoenix, Jan. 5-6, 1915. Sec., Dr. John Wix Thomas, 200 Nat'l Bank of Ariz. Bldg., Phoenix.

ILLINOIS: Chicago, Jan. 13-15, 1915. Sec., Dr. C. St. Clair Drake, Springfield.

INDIANA: Indianapolis, Jan. 12-14, 1915. Sec., Dr. W. T. Gott, State House, Indianapolis.

IOWA: Des Moines, Jan. 19-21. 1915. Sec., Dr. Guilford H. Sumner, Capitol Bldg., Des Moines.

MINNESOTA: Minneapolis, Jan. 5-8, 1915. Sec., Dr. Thomas McDavitt, 814 Lowry Bldg., St. Paul.

NEW MEXICO: Santa Fe, Jan. 11, 1915. Sec., Dr. W. E. Kaser, E. Las Vegas.

NEW YORK: Albany, Buffalo, New York, Syracuse, Jan. 26-29, 1915. Mr. H. H. Horner, Chief, Examination Division, State Education Bldg., Albany.

NORTH DAKOTA: Grand Forks, Jan. 5, 1915. Sec., Dr. G. M. Williamson, Grand Forks.

OKLAHOMA: Oklahoma City, Jan. 12-14, 1915. Sec., Dr. John W. Duke, Guthrie.

RHODE ISLAND: Providence, Jan. 7, 1915. Sec., Dr. Gardner T. Swarts, State House, Providence.

SOUTH DAKOTA: Pierre, Jan. 12, 1915. Sec. Dr. P. B. Jenkins, Waubay.

UTAH: Salt Lake City, Jan. 4-5, 1915. Sec., Dr. G. F. Harding, 407 Templeton Bldg., Salt Lake City.

VERMONT: Montpelier, Jan. 11-13, 1915. Sec., Dr. W. Scott Nay, Underhill.

WASHINGTON: Walla Walla, Jan. 5, 1915. Sec., Dr. C. N. Suttner, Baker Bldg., Walla Walla.

WISCONSIN: Madison, Jan. 12-14, 1915. Sec., Dr. John M. Beffel, 3200 Clybourn St., Milwaukee.

North Carolina June Report

Dr. Benjamin K. Hays, secretary of the North Carolina State Board of Medical Examiners, reports the written examination held at Raleigh, June 9, 1914. The total number of subjects examined in was 14; percentage required to pass, 80, and not less than 35 in any one branch. The total number of candidates examined was 118, of whom 81 passed and 37 failed. Twenty-six candidates were licensed through reciprocity. The following colleges were represented:

PASSED

College	Year Grad.	Total No. Examined
Howard University	(1911)	1
Atlanta College of Physicians and Surgeons	(1913)	1
Bennett Medical College	(1913)	1
Tulane University of Louisiana	(1914)	1
Baltimore University	(1893)	1*
University of Maryland	(1912, 1) (1913, 1)	(1914, 9) 11
St. Louis University	(1914)	1
Leonard Medical School	(1914)	4
North Carolina Medical School	(1913,2);	(1914,16) 18
Jefferson Medical College	(1912,1); (1913,1);	(1914,14) 16
Medico-Chirurgical College of Philadelphia	(1912)	1
University of Pennsylvania	(1914)	10
Medical College of the State of S. C.	(1914)	1
Chattanooga Medical College	(1903)	1
University of Tennessee	(1902)	1
Medical College of Virginia	(1914)	12

* Granted a limited license.

FAILED

Atlanta Medical College	(1914)	2
Chicago College of Med. and Surg.	(1912,1) (1913,1)	2
College of Physicians and Surgeons, Baltimore	(1914)	1
University of Maryland	(1912)	1
College of Phys. and Surgs., Boston	(1910, 1) (1911, 1)	2
Leonard Med. Col...	(1911,1) (1912,2) (1913,5) (1914,1)	9
North Carolina Med. Coll.	(1903,2) (1912,1) (1913,2) (1914,3)	8
Medical College of the State of S. C.	(1912)	1
Chattanooga Medical College	(1903,1) (1908,1)	2
Meharry Medical College	(1907,1) (1914,1)	2
University of the South	(1905,1) (1909,1)	2
University of West Tennessee	(1912,1) (1914,2)	3
Medical College of Virginia	(1913,1) (1914,1)	2

LICENSED THROUGH RECIPROCITY

College	Year Grad.	Reciprocity with
Georgetown University	(1901)	Oklahoma
Atlanta School of Medicine	(1909)	Georgia
College of Physicians and Surgeons, Chicago	(1907)	Illinois
University of Louisville	(1893) Louisiana; (1905)	Tennessee; (1911, West Virginia.
Medical School of Maine	(1891)	Mass.

College of Physicians and Surgeons, Baltimore	(1898)	Mass.
Johns Hopkins University	(1913)	Dist. Colum.
Maryland Medical College	(1901)	Mass.
University of Maryland	(1908) Maryland; (1911)	S. Carolina
Long Island College Hospital	(1889)	Virginia
University and Bellevue Hosp. Med. Coll.	(1905)	New York
University of Pennsylvania	(1909)	Virginia
Medical College of the State of S. Carolina	(1903)	S. Carolina
Medical College of Virginia	(1906) Virginia; (1900) (1911) (1912) West Virginia.	Virginia;
University College of Medicine, Richmond	(1911) (1913)	Virginia
University of Virginia	(1897) (1908) Mississippi; (1910)	New York
University of Edinburgh	(1893)	England

West Virginia July Report

Dr. S. L. Jepson, secretary of the West Virginia State Board of Health, reports the oral, practical and written examination held at Elkins, July 1-3, 1914. The total number of subjects examined in was 9; total number of questions asked, 90; percentage required to pass, 80. The total number of candidates examined was 34, of whom 32 passed, including 2 osteopaths and 2 failed. Fourteen candidates were licensed through reciprocity. The following colleges were represented:

PASSED

College	Year Grad.	Per Cent.
Bennett Medical College	(1914) 81, 82, 83.5, 85, 85.2, 87.8.	
Chicago College of Medicine and Surgery	(1914)	85.8
College of Physicians and Surgeons, Baltimore	(1906) 85.7; (1913) 83, 87; (1914) 83.4, 84.3, 84.8, 85, 85.9, 86.5, 87.1, 87.8, 89.4, 90.2.	
University of Maryland	(1914) 82.6, 83, 89.2.	
University Medical College, Kansas City	(1913)	85
Starling-Ohio Medical College	(1914)	88.1
Medical College of Virginia	(1914) 82, 82, 85, 87, 91.2.	

FAILED

College of Physicians and Surgeons, Baltimore	(1914)	71.7
Maryland Medical College	(1912)	78

LICENSED THROUGH RECIPROCITY

College	Year Grad.	Reciprocity with
Georgetown University	(1904)	Dist. Colum.
George Washington University	(1907) (1913)	Dist. Colum.
Bennett College of Eclectic Medicine and Surgery	(1906)	Penna.
Kentucky School of Medicine	(1904)	Virginia
University of Louisville	(1912)	Tennessee
College of Physicians and Surgeons, Baltimore	(1896)	Penna.
University of Maryland	(1909) Virginia; (1912)	Maryland
Western Reserve University	(1913)	Ohio
Lincoln Memorial University	(1913)	Tennessee
Tennessee Medical College	(1907)	Tennessee
University of West Tennessee	(1908)	Tennessee
Medical College of Virginia	(1901)	Virginia

West Virginia October Report

Dr. S. L. Jepson, secretary of the West Virginia State Board of Health, reports the oral, practical and written examination held at Clarksburg, Oct. 13-15, 1914. The total number of subjects examined in was 9; total number of questions asked, 90; percentage required to pass, 80. The total number of candidates examined was 11, of whom 9 passed, including 1 osteopath, and 2 failed, including 1 osteopath. Eleven candidates, including 1 osteopath, were licensed through reciprocity. The following colleges were represented:

PASSED

College	Year Grad.	Per Cent.
Chicago College of Medicine and Surgery	(1914)	91
Baltimore Medical College	(1913)	83
College of Physicians and Surgeons, Baltimore	(1914) 80, 84.8, 85.	
University of Maryland	(1914)	89
Starling-Ohio Medical College	(1914)	83
Medical College of Virginia	(1904)	89

FAILED

Meharry Medical College	(1912)	78

LICENSED THROUGH RECIPROCITY

College	Year Grad.	Reciprocity with
University of Louisville	(1911) (1912)	Kentucky
Baltimore Medical College	(1911)	Maryland
Maryland Medical College	(1905)	Georgia
University of Maryland	(1911) Florida; (1913)	Maryland
New York Homeo. Med. College and Flower Hosp.	(1901)	New York
Eclectic Medical College, Cincinnati	(1913)	Tennessee
Cleveland Homeopathic Medical College	(1905)	Penna.
University College of Medicine, Richmond	(1911)	Virginia

Book Notices

LA STASE INTESTINALE CHRONIQUE. Par le Docteur E. Sorrel, ancien interne, lauréat des Hôpitaux de Paris. Paper. Price, 8 francs. Pp. 252, with illustrations. Paris: G. Steinheil, 1914.

The subject of chronic intestinal stasis has become quite popular of late, the term having been popularized by the writings of Lane. In this monograph the author reviews the subject historically, and then enters into an extensive description of the embryology, anatomy, histology and pathology of the large intestine. In discussing the theory of Metchnikoff that not only the appendix but also the cecum and colon are undergoing regression, and that they are not only useless but even harmful organs, the author says, "This appears to be going a little too far, but if it is difficult at least to admit that in a normal state the large intestine is a highly harmful organ it seems to be more admissible that in certain pathological states, particularly when there is a stagnation of the fecal matter, absorption of toxic products may take place from the large intestine and this is a point recognized by all to-day." Under pathogenesis of intestinal stasis the author considers the various theories which have been advanced, such as the cæcum mobile of Wilms, typhlatonia of Fischler, habitual tortion of the cecum of Klose, Lane's kink, Jackson's membrane, chronic inflammatory adhesions, congenital folds, Hirschsprung's disease, etc. The author does not believe in Lane's mechanical theory as to the cause of the colonic adhesions, nor is he entirely convinced of the congenital origin of them. He says: "The matter is difficult to decide and it appears in practice one should not trust too much to the possibility of the congenital origin of the lesions, and to infer, therefore, that recurrence will not take place after section. It may be that there were primarily congenital lesions and no less true that at the time of intervention there may be other lesions added thereto, which one ought to take into account when it comes to the treatment." Under treatment the author quotes good results at the hands of and by the methods of each of the originators and defenders of the various theories mentioned. As some of the methods of treatment are the direct opposite of others, it is evident that the good results mentioned must often have been tempered with considerable enthusiasm. The author subdivides the various methods of treatment into three classes, namely, (1) the fixation of a part, (2) the liberation of adhesions of another part, and (3) the diversion of the intestinal contents by entero-anastomosis with or without exclusion, with or without resection. In the author's conclusions it is stated that the methods under the first class have been practically rejected. Those under the second find a more general application, while in the severer cases some of the methods under the third class will have to be resorted to. The volume closes with a report of several cases in which operation was performed according to the various methods by different operators, and a brief summary of the author's conclusions.

TUBERCULOSIS OF THE BONES AND JOINTS IN CHILDREN. By John Fraser, M.D., F.R.C.S.E., Assistant Surgeon, Royal Hospital for Sick Children, Edinburgh. Cloth. Price, $4.50 net. Pp. 352, with 215 illustrations. New York: The Macmillan Company, 1914.

As an attempt to cover comprehensively this large and important subject, the book is not satisfactory. The sections on etiology and pathology are good, and form an epitome of the latest and best investigations. Proper emphasis is laid on the importance of recognizing tuberculous cow's milk as a dominant factor in the causation of the disease in children. The sections on diagnosis and treatment are disappointing. The descriptions of operations are often not sufficiently clear to be of use, and in some instances are distinctly incorrect, as in the cases of the Albee and the Hibbs operations on the spine. The photographs and photomicrographs are remarkably good and are valuable. Many of the line drawings, particularly of apparatus, are unworthy of a book of this character, and the crayon reproductions of Roentgen-ray negatives are wholly valueless.

HUMAN DERELICTS. Medico-Sociological Studies for Teachers of Religion and Social Workers. Edited by T. N. Kelynack, M.D. Cloth. Price, 5 shillings. Pp. 341. London: Charles H. Kelly, 1914.

This book is intended for the use of social workers, including clergymen, medical officers of health and teachers. The topics treated, each by a different author, include "Idiots and Imbeciles," "Lunatics," "The Feeble-Minded," "The Epileptic," "The Inebriate Derelict," "The Criminal Derelict," "The Recidivist," "The Mentally Defective Criminal Derelict," "The Vagrant," "The Prostitute," "Senile Derelicts," "The Derelict Deaf" and "The Derelict Blind." Naturally, a book which covers so wide a range of subjects within 350 pages cannot undertake an exhaustive discussion of any of them. The treatment, therefore, is that of the practical handbook: a general survey of each topic, a brief bibliography on each, references to recent legislation bearing on the class of derelicts under consideration, and the names and addresses of institutions and societies dealing with such derelicts. While of some interest to American readers, the book will find its greatest field of usefulness in Great Britain, since it is written from a British point of view and the practical information furnished bears chiefly on British institutions and legislation.

PRACTICAL ORTHODONTIA. By Martin Dewey, D.D.S., M.D., Professor of Dental Anatomy and Orthodontia, Kansas City Dental College. Cloth. Price, $3.50. Pp. 342, with 248 illustrations. St. Louis: C. V. Mosby Company, 1914.

This book is an attempt to include certain principles which the author has found partially to fulfil the needs of his students. Like all other specialists, on the subject of orthodontia, the author is satisfied to base his premise on occlusion of the teeth, regardless of the etiologic factors giving cause and effect. While it is true that malocclusion will in a small measure influence the teeth in the wrong direction in their development, yet the great etiologic factors governing abnormal development are not appreciated or understood. Until dental specialists and teachers are able to grasp the broader principles of cause and effect, very little scientific progress can be expected. Another criticism is the lack of giving due credit to those who have originated ideas and appliances and of which this work abounds. The mechanical appliances and their application are all that are to be desired for obtaining given results. The illustrations, paper and binding are good.

A SYSTEM OF SURGERY. Edited by C. C. Choyce, B.Sc., M.D., F.R.C.S., Dean of Operative Surgery in the London School of Clinical Medicine. Pathological Editor, J. Martin Beattie, M.A., M.D., C.M., Professor of Bacteriology in the University of Liverpool. Volume III. Cloth. Price, $7. Pp. 901, with 276 illustrations. New York: Funk & Wagnalls Company, 1914.

This volume, edited by C. C. Choyce in collaboration with a number of notable English surgeons, is on a par with the two preceding volumes. The text is well written, the illustrations illuminating. The contributions are clear and concise, setting forth the essential features of the subjects under discussion. Perusal of the various chapters shows that the latest contributions to surgical knowledge have not been overlooked, while at the same time a certain conservatism is shown in avoiding the recommendation of methods of treatment which have not become recognized procedures by surgeons in general. As a student's text-book and as a work of reference this system of surgery cannot be too highly recommended.

EYE, NOSE, THROAT AND EAR. A Manual for Students and Practitioners. By James Forrest, M.B., Ch.B. Resident Medical Officer Central London Ophthalmic Hospital. Cloth. Price, $4. Pp. 403, with 134 illustrations. St. Louis: C. V. Mosby Company, 1914.

This volume is well illustrated and concisely written. Commoner ailments are described fairly completely while rare ones are only mentioned. Operative procedures are described in detail. The book is comprehensive for a manual, and contains a good index. An error, probably in proofreading, that may lead to confusion is found on page 358, where it is stated that esophagoscopy is performed in a similar manner to tracheotomy (tracheoscopy).

Miscellany

The New York Home Hospital—An Experiment

The New York Association for Improving the Condition of the Poor has for two years been carrying on an experiment of unusual interest. A report recently issued gives the experience of the association in conducting what is known as the Home Hospital Experiment, inaugurated two years ago for the purpose of answering, if possible, three questions: 1. Is it possible to treat families in which one or more members are afflicted with tuberculosis, keeping the family together in the home without danger to other members of the family? 2. Do the results of treating patients in their own homes under ordinary conditions of living with adequate medical supervision compare favorably with results secured by removing a patient from his home and treating him in a sanatorium or other institution for tuberculosis? 3. In the case of a family in which there is combined tuberculosis and poverty, which costs more, to treat the family as a unit, as is done at the Home Hospital Experiment, or to break up the home, as is done under other methods of treating families infected with tuberculosis? The limitations of the experiment required that a certain number of families afflicted with tuberculosis should be treated under conditions which would maintain the family life intact and independent, yet subject to the necessary conditions for recovery, and which would restore the family to its position as a self-supporting, wage-earning social unit. As the report truly says: "Tuberculosis is not merely a human disease; it is a social disorder, and the real problem is not alone the patients, but the family and the conditions under which they live." The Home Hospital, the first section of which was opened March 18, 1912, and the second Nov. 24, 1913, consists of forty-eight apartments of from two to four rooms, each including one or more bedchambers with open-air sleeping balconies. No expense was spared to provide these apartments with a maximum amount of sunlight and outdoor air. A solarium, a playground and a fresh-air school were established on the roof of the building. Four of the apartments were used for administrative purposes. In the remaining forty-four apartments selected families were installed, preference being given to families in which both poverty and tuberculosis were relatively incipient, to families possessing sufficient intelligence to cooperate, to families in which dependence was due to tuberculosis infection on the part of the wage-earner and to families in which tuberculosis of the mother rendered it impossible to keep the home intact under ordinary circumstances. This method provided for the oversight and care of children too young to be admitted to hospital sanatoriums, to patients unwilling or unable to leave their families and to the more or less chronic second stage, able-to-be-about cases, which are almost entirely unprovided for by other institutions. Careful investigation of family conditions was made in each case before admission and the plan was explained to each member of the family. All able-bodied persons were required to work and to account to the hospital for the expenditure of their incomes. Supervision and instruction by the resident staff and the attending physicians of the Home Hospital was insisted on. On the other hand, the association furnished to each family everything that was necessary for the maintenance of a normal standard of living and for the medical treatment of the patients in so far as the families themselves were not able to provide it. In a word, the experiment consisted of treating families for tuberculosis and the poverty which results therefrom, instead of treating individuals for tuberculosis alone. The social significance of this experiment can hardly be overestimated.

Space does not permit of a detailed résumé of the methods followed and the experiences acquired. Those interested in this unique experiment and its results will secure a copy of the report and study the details with care. The medical results for the first two years show that seventeen families have been rehabilitated physically and that eight others have been dismissed from the hospital either for frequent intoxi-

cation or for persistent refusal to follow advice and direction. The results obtained in the adult cases are 46.6 per cent. apparently cured, 35.5 per cent. arrested and 17.7 per cent. much improved. Every patient who has followed the advice given has improved, with the exception of one patient far advanced, who died 198 days after admission. No well member of any family has developed symptoms of the disease. Economically, the result is equally striking. Eleven families discharged as rehabilitated, had, on entering the hospital, an average income of $6.34 a week. When discharged the average income of each of these families was $10.75 a week. Of the seventeen families discharged as rehabilitated during the two years of the experiment, the average income on admission was $6.37 a week; when discharged the average earnings were $12.41 a week. In other words, the family income had practically doubled in two years, while the condition of the infected members had greatly improved and the healthy members had been protected from infection. No more dependent invalids had been created, while the families had in each case been taught better, cleaner and healthier ways of living.

Financially, the experiment showed a balance sheet in its favor. Sixty-four families were admitted to the hospital during two years. The average number of individuals per family was five during the first year and 5.09 during the second year. Total days' care for patients and non-patients was 31,505 during the first year and 48,775 during the second year. The per diem cost per family during the first year was $3.54, during the second year, $3.32. The per capita per diem cost of both patients and non-patients was 70.8 cents the first year and 65.03 cents during the second year. Exclusive of administration, the per capita per diem cost was 50 cents and during the second year 47 cents. The total cost of the care of the sixty-four families during two years was $61,932.96, of which living expenses cost $38,000, administration and supervision $15,000, and general operating expenses made up the balance. The earnings of the families amounted to $15,313.06, making a total expenditure by the Home Hospital of $49,619.90. Doubling the capacity at the end of the first year reduced the cost of supervision and administration both per family and per capita.

An itemized statement of the various expenses is worthy of careful study, but cannot be quoted in detail. The essential factor in the entire plan, however, is the comparative cost of the Home Hospital and of the ordinary institutional method of treatment. In determining the average cost of institutional treatment, data from a large number of sources are assembled and analyzed, with the result that the average cost of maintenance of an advanced tuberculosis patient in an institute is estimated at $1.40 a day or $9.80 a week. The average cost of institutional maintenance for children and infants is standardized in the same way. Careful comparison is instituted in the case of different types of families; that is, those in which all members are infected, those in which all except the father and wage-earner are infected, etc. Comparison of the relative expense, in the case of a family in which the mother and one or more children have tuberculosis, and in which, under ordinary conditions, the family would be broken up and all except the father sent to public institutions, shows that under such a plan the net cost of maintenance, after the father's earnings are deducted, would be $23.75, which expense would fall on the public, while under the Home Hospital plan of keeping the family intact, the net cost after deducting the father's earnings is only $17.61, a saving of $6.14 a week, or $319.28 a year. The family is kept intact, the father and wage-earner is given a home, and the evils resulting from disruption of the family and institutional life are avoided. The actual cost of caring for tuberculosis families of all classes in the Home Hospital was found to be less than the cost of caring for the same family in institutions, while the social advantages gained by avoiding breaking up the family, depriving the well members of a home, subjecting the infected members to institutional conditions and increasing rather than correcting the dependency of the family, clearly shows the superiority of the home method over the ordinary institutional plan.

The experiment is one of the greatest importance and interest. Whether such methods can be applied to large numbers of families rather than to a few carefully selected ones, remains to be shown, but the experiment is a demonstration of the possibility of developing rational methods which will not disturb normal social and domestic conditions, and which will at the same time relieve the individual of the disease and the family of the social and economic consequences.

Medicolegal

Prosecution Under Wrong Provision and Indictment Erroneously Changed

(*Rutherford vs. State* (*Tex.*), *169 S. W. R. 1157*)

The Court of Criminal Appeals of Texas reverses a conviction of pursuing the occupation of itinerant physician, going from place to place, in the practice of that profession, without paying the tax levied by law. The court says that it does not think the evidence would sustain the conviction. The evidence conclusively showed that the accused had been a resident of the city of Vernon for more than a year at the date of the institution of these proceedings, and that he was guilty of violating that provision of the code prohibiting any one practicing medicine without having obtained a license from the medical board and registering same, and not the article preventing one from practicing medicine as an itinerant physician without having paid an occupation tax. Had he paid the occupation tax under the evidence in this case, he would not have been authorized to practice medicine, and, as the evidence clearly showed that his fixed residence since he had been in the state had been at Vernon, he would not be liable for the tax levied on traveling physicians. Furthermore, in that part of the indictment wherein it was intended to allege that he "followed the occupation of physician, traveling from place to place," etc., the word "physician" was written "physicial," an "l" being written where it should have been an "n." It was moved to quash the indictment because there was no such occupation taxed as a "physicial," but, instead, the trial court ordered the clerk to change the indictment so as to read "physician." This it had no authority to do, as this word was a matter of substance in the offense charged, and, under the code of criminal procedure, an indictment cannot be amended in matter of substance. An indictment thus altered will not support a conviction. But had the trial court not undertaken to change the wording of the indictment, the whole context might have been sufficient, notwithstanding this mistake in spelling the word "physician."

Admissibility in Evidence of Physician's Book of Visits and Proof of Accounts

(*Bellows vs. Bender et al.* (*N. Y.*), *149 N. Y. Supp. 548*)

The Supreme Court of New York, Appellate Term, Second Department, reverses a judgment entered for the plaintiff, a physician, against the defendants, executors, for professional services rendered to their testator, a new trial being ordered because of error in the admission in evidence of the physician's book of visits and proof of claim. The court says that the plaintiff was permitted to testify that the book was one in which he kept the accounts of patients visiting him and whom he treated; that the entries were made by him on the respective dates shown by the entries; that the book showed an account with the decedent; that the page of his account book purporting to show his attendance in this case was an account which he made up and entered each time the patient came to his office. Besides proving by another physician, who claimed to have been present at the plaintiff's office on the occasion of some visits made by the patient to the plaintiff, and who gave no evidence regarding the book entries, there were called by the plaintiff two patients or persons by whom it was sought to prove that they had settled their accounts with the plaintiff by his books. Unless it was made clearly

to appear that these two persons, or at least one of them, had settled his accounts with the plaintiff according to his books and on the strength thereof, the proof that the book was correct was made by the plaintiff alone. One of the witnesses testified that whenever the plaintiff rendered a bill he paid it, that he kept track of all his visits, "but no track of his books." The second witness, when shown what purported to be her account, said that she had never seen that account before, and, like the other witness, testified to nothing from which it could be found that she had settled her accounts with the plaintiff from his book. To make such witnesses competent, they must testify that they settled their accounts by the plaintiff's book, and not by bills rendered to them. In Swan vs. Warner, 197 N. Y. 190, which was an action brought to recover for professional services rendered as a physician, the court reiterated the much-cited rule governing the admission of a party's books "for the purpose of sustaining his claim in an action like this," that rule being: "They ought not to be admitted where there are several charges, unless a foundation is first laid for their admission, by proving that the party had no clerk, that some of the articles charged have been delivered, that the books produced are the account books of the party, and that he keeps fair and honest accounts, and this by those who have dealt and settled with him." If the foregoing analysis of the testimony was correct, there was nothing left in the case to prove that the plaintiff kept correct books of account, apart from his own testimony, and that was insufficient to authorize the reception of a book under the account book rule. In the case of a physician, the books should show visits to patients, regularly entered in the course of professional duties. Their total number furnishes a basis for proof by other physicians of value according to the accustomed charges in the locality, and when coupled with independent evidence that some of the visits were actually made, and that other patients had settled their accounts with the physician from his books, the entries of his visits or attendance on them therein stated being correct and true, a physician's book of visits is then open for the inspection of the court, and, if found free from suspicion and sufficiently orderly to convey intelligence on perusal, the book becomes competent evidence of the visits before the court or the jury, as the case may be. Nor could the value of the plaintiff's services be proved by an entry which he made of a bill sent to the estate.

Manslaughter in Death from Roentgen Rays—Culpable Negligence—Judicial Notice

(State vs. Lester (Minn.), 149 N. W. R. 297)

The Supreme Court of Minnesota affirms an order overruling a demurrer to an indictment charging the defendant with manslaughter in the second degree, under a statute declaring manslaughter to be of this degree when committed without any design to effect death, "by any act, procurement or culpable negligence" not constituting a higher crime. The indictment alleged, among other things, that the defendant, without authority of law, but without a design to effect her death, did feloniously use and employ on the body of a named patient a Roentgen-ray machine for the purpose of taking a roentgenogram of her hip for his own sole use and purpose, with her consent, extracted from her on his assurance that it would do her no harm; that the machine was dangerous, except when operated by a skilful manager, which the defendant knew, or, in the exercise of the care required under the circumstances, he should have known, and yet he placed the tube unreasonably close to her body, and, disregarding his duty to her, he negligently and carelessly failed to give her proper attention, operated the machine in an unskilful manner, and kept her body so exposed for an unreasonable length of time, thereby inflicting on her body, in the region of the right hip, a mortal burn, from which she died. The court thinks the indictment sufficient, although it was not a model one.

The important question was whether the criminality of the defendant's acts as constituting the crime of homicide by "culpable negligence" was sufficiently alleged. Not every careless or negligent act whereby death ensues comes within the statute, and something more must appear than the essentials necessary to impose civil liability for damages. When considered as the basis of a charge of manslaughter against a medical man, or person assuming to act as such, culpable negligence exists where he exhibits gross lack of competency or inattention, or wanton indifference to the patient's safety, which may arise from his gross ignorance of the science or through gross negligence in either its application or lack of proper skill in the use of instruments. Where, however, he does nothing that an ordinarily skilled and careful practitioner might not do, and death results merely from an error of judgment or accident, no criminal liability attaches. "Gross," as here used, is intended to convey the idea of recklessness with regard to the safety of others, or "foolhardy presumption."

The failure to allege knowledge on the defendant's part that his acts involved probability of serious consequences to the patient was not fatal to the indictment, the defect, if any, in this regard, being cured by the presumption of contemplation of probable consequences. Neither was it necessary to allege the defendant's duty to the patient under the circumstances, nor to set up a specific standard by which his acts might be measured, these being matters of law. If, then, the facts alleged showed such incompetency or inattention or indifference to the safety of the patient as has been indicated as necessary to give rise to criminal liability, the indictment must be upheld, though it charged neither "culpable" nor any other degree of negligence by name, nor the defendant's acts in other than general terms and as ultimate facts.

The court takes judicial notice that Roentgen-ray machines sometimes inflict serious burns, and the indictment characterized the instrument used as dangerous, unless skilfully handled, and presumptively known to the defendant to be such, notwithstanding which he placed it too close to his subject, and also failed during an excessive exposure to give the attention requisite to prevent injury. These allegations imported criminal negligence.

Society Proceedings

JOINT MEETING OF THE NEW YORK NEUROLOGICAL SOCIETY AND THE NEUROLOGICAL SECTION OF THE NEW YORK ACADEMY OF MEDICINE

Held Nov. 10, 1914

DR. SMITH ELY JELLIFFE in the Chair

Scleroderma, with Contractions

DR. S. P. GOODHART: An unmarried girl, aged 24, about nine years ago noticed a swelling of the toes, followed by increasing stiffness of the toes and knees, and a feeling of coldness and weakness in the lower extremities, with paroxysmal attacks of whiteness of the skin of the hands, together with pain and tingling. With the disappearance of the blanching, the hands would become congested and then cyanotic. The hands lost in function, and flexure contractures soon appeared. These symptoms for a time increased in severity and then remained stationary. About five and a half years ago, the patient noticed pigmentation of the chest and a peculiar stiffness of the face, so that she was scarcely able to open her mouth. Some months later there was some improvement in the power of moving the knees and toes. When the weather was cold she noticed a numbness of the nose and tongue, but not of the lips or ears. The legs could be separated for a distance of only about 6 inches at the knees, owing apparently to fixation at the hip joints. Over the feet there was a hide-bound condition, but less marked than in the hands, which presented the typical appearance of a pronounced sclerodactylia. The face was distinctly masked in character, with all lines obliterated: the

palpebral fissures were wide, giving a strange expression to the eyes. The margins of the lips were very narrow, and the mouth was held stiffly and always partially open, giving rise to a mummified expression. The nose was narrow and angular. The ears, which were indurated, thin and blanched, were held rigidly down. The mucous membrane of the mouth was becoming involved, showing some induration to the touch. The scalp showed no abnormality. The mammae were fairly well developed. Trophic disturbances were well marked over the small joints of the fingers and toes. The skin showed glossiness as well as pigmentation. Many scars were present, due to previous ulcers of the fingers and toes. A few years ago there was a slight but manifest diminution to painful stimuli from the finger-tips up to the wrists: this was also true of the feet and ankles. At present, no sensory changes were found excepting that there was a lack of proper appreciation of hot and cold stimuli.

DISCUSSION

DR. WALTER TIMME: This condition is one of generalized connective tissue hyperplasia; the scleroderma is only a single manifestation. This hyperplasia is secondary, as a rule, to a disturbance of the sympathetic and autonomic nerve supply. In most of these cases there is a history of an antecedent high grade sympathicotonia, and as this increases, tissue hyperplasia begins, sometimes in the muscles and joints, and occasionally in the thyroid, the hypophysis cerebri and blood vessels. It is an overactive sympathetic and an underactive autonomic system. In the end, it probably resolves itself into a question of disturbance of the internal secretions, and from a therapeutic point of view we have seen some benefit from the use of various internal secretions.

Pilous Cerebral Adiposity

DR. WALTER MAX KRAUS: The patient, man, aged 31, had been accustomed to drink from five to seven glasses of beer daily up to the onset of his present illness in 1910. He smoked moderately. He gave a history of measles, chickenpox, diphtheria and whooping-cough in childhood, and some form of arthritis from the age of 24 (1908) until one year ago. The soles of his feet were sore, and later the tissues about the knees became red, swollen, hot and painful. After several of these attacks, there was some limitation of motion, but one year ago, the patient was cured. Between the ages of 3 and 4 years he fell from the fifth story of his residence to the ground, resulting, as he states, in a fracture of the crown of the skull. He was unconscious for about fourteen hours and disabled for six months. From that time until the age of 13 he was entirely well. Then he began to have attacks of Jacksonian epilepsy, which occurred from three to six times yearly and were not of sufficient severity to cause the patient either to tell his parents or seek the aid of a physician. At the age of 25, a little over twelve years after the first attack, the attacks ceased and had not since recurred.

Four years ago, at the age of 27, the patient began to grow fatter. At that time his weight was 150 pounds; in 1912 it had increased to 204 pounds; in 1913 to 263 pounds, and his weight at the present time is 282 pounds. At about the same time as this increase in adipose tissue began, the following symptoms made their appearance: His hair began to increase over the trunk and extremities, he felt sleepy, and as time went on he would fall asleep involuntarily in addition to sleeping a good deal voluntarily. In 1910, while driving a large automobile truck, he fell asleep, allowing the truck to run into a building. These narcoleptic attacks have continued since. The patient's appetite for food, especially meat and carbohydrates, has increased. He also complains of shortness of breath and sweats a good deal. Three and a half years ago he noticed that the penis was smaller and that shortly afterward his sexual desire grew less until now he has none at all.

DISCUSSION

DR. I. ABRAHAMSON: In Mount Sinai Hospital there is now a young woman with very similar manifestations. She gives a history of amenorrhea, hyperhidrosis, peculiar skin changes and adiposity; she complains of sleepiness and has a growth of hair on the face and body, but the urine contains sugar and shows evidences of an advanced nephritis. A blood count gave 6,100,000 red cells and 10,000 white cells, with 110 per cent. of hemoglobin. The urine constantly contains a small percentage of sugar. The facies is like a typical one of polycythemia. The moist skin in this case might be attributed to the nephritis as well as the polycythemia, but is most likely a part of the polyglandular disease.

DR. WALTER TIMME: The hypertrichosis present in this case is not quite as generally distributed as stated. On closer inspection it is seen that the distribution is radicular in character, and furthermore skips the areas supplied by the cervical roots, to begin again at the dorsal level. This arrangement corresponds with the position of the cells of the superior spinal sympathetic nucleus, which is non-existent in the cervical region of the cord, and begins at about the first dorsal level. This is rather suggestive, therefore, of sympathetic involvement.

AMERICAN ASSOCIATION FOR STUDY AND PREVENTION OF INFANT MORTALITY

Fifth Annual Meeting, held at Boston, Nov. 12-14, 1914

Under the presidency of DR. J. WHITRIDGE WILLIAMS, Baltimore

Prenatal Care

DR. ARTHUR B. EMMONS II, Boston: Prenatal care is preventive medicine as applied to obstetrics. To obtain the greatest efficiency there must be cooperation of the various scientific laboratories in the medical school to further our knowledge. The medical societies and journals should disseminate authoritative knowledge. The hospitals must also cooperate by providing ample care for doubtful and dangerous cases. The state and municipal health boards, milk stations and social forces, both public and private, should cooperate to make its application to the community possible, as well as the efforts of patient and family.

DISCUSSION

MRS. MAX WEST, Federal Children's Bureau, Washington, D. C.: Two of the most important pieces of prenatal work in this country are those undertaken in Boston in 1909 by the Women's Municipal League, and in New York in 1911 by the New York Milk Committee. The statistical results of these two experiments prove conclusively that prenatal care, systematically and intelligently given, lowers the number of stillbirths and miscarriages, decreases the number of babies who die under 1 month of age, and increases the number of breast-fed babies. In Boston the stillbirth rate was about 40 for every thousand living births; among supervised mothers it was about 28. In New York the rate was 47.5 for Manhattan at large, and 39.8 among supervised mothers. In Boston the average weight of the babies of supervised mothers was 7 pounds, 11 ounces, including prematures, an increase of several ounces over the usual average. The importance of prenatal care in establishing breast feeding is shown in every city where records have been kept. Prenatal work is now being done to a greater or less extent in about forty cities of this country, by fifty or more organizations, but is yet in its infancy.

DR. S. JOSEPHINE BAKER, New York: Among the mothers that have been under our care, approximately 500, we have had no deaths; 96 per cent. of the babies born are living now; the deaths under 1 month per thousand births have been reduced about one-half. We have used the infants' milk stations as centers; here the women are registered, and they are visited every ten days before confinement and every day for ten days after birth of the baby, when they are referred back to the milk station for observation.

MISS FANNE F. CLEMENT, Superintendent, Red Cross Town and Country Service, Washington, D. C.: In small communities the visiting nurse has perhaps from one to six physicians

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under whose direction her actual nursing services are rendered. If there is but one, as not infrequently happens, it becomes absolutely necessary that she have his good will and cooperation; otherwise her work cannot succeed. This attitude on the part of the physician in the country is a much more important item than in the city, where the sphere of the public health nurse as it relates to the medical profession is much better understood, not only by doctors but by the laity in general, who lend her moral support. The absence of hospitals, dispensaries and other health agencies in country districts leaves the greater responsibility in the hands of physicians and visiting nurse agencies in these sections, on whom it devolves to create and extend a public sentiment favorable to health. Not only are physicians in rural communities often few, but in many instances their lack of proper professional equipment and their unconcern for up-to-date knowledge in preventive medicine create a difficult situation for the public health nurse who has had special training for her work. Regarding prenatal visiting particularly, this has been found to be the case. A rural nurse in Maine reports that she is not permitted by the local doctor to make prenatal visits except in special instances. In a Pennsylvania community of 8,000 foreign population, where the visiting nurse is employed by an industrial company, she has gradually come to know practically every family. It has been her special endeavor to become friends with the mothers, so that they would allow her to make prenatal visits and be induced to employ physicians when their babies were born. Because a few mothers, in the beginning, liked the way the nurse cared for their babies, and first of all because they liked the nurse, all the mothers now call her, which means that the opportunity for prenatal visiting is greatly increased, that a physician is in attendance during delivery and that the midwives are seeking new fields. The two or three physicians with whom she works turn over to her charge expectant mothers reporting to them, and she visits them weekly.

Care of Institutional Infants Outside of Institutions

DR. J. H. MASON KNOX, JR., Baltimore: Out of 229 foundlings committed by the city to institutions in the last ten years, 204, or 88 per cent., died within a few weeks. Many of these children were diseased and weak, but the large majority were healthy new-born babies, whose lives were lost simply because their environment was not suited to their needs. The institutions to which they were committed were excellent of their kind, good milk, regular feeding and kindly nursing was furnished. The thing that was lacking, and which seems to be essential for baby life is individualizing, motherly care and quiet.

Mortality in So-Called Foundling Institutions

DR. PHILIP VAN INGEN, New York: From 1909 to 1913 inclusive, 28,210 children under 2 years of age were cared for in eleven institutions in New York state, and the death rate for babies under 2 years for the same period, based on the total number of children cared for, varied in the different institutions from 183 to 576 per thousand, with a general mortality rate for the eleven of 422.5 per cent. for the five years. During the years 1909 to 1912 inclusive, the death rate for children under 2, based on the estimated population for the state at that age, was 87.4, practically one-fifth of that in institutions. In one institution which has a large maternity service, there were only four deaths of babies during the first week of life among 298 born during the year, a death rate of 13.4 per thousand, or 3.9 per cent. of the total mortality under 1 year. In a very high class obstetric hospital, the death rate under 7 days was 25.4. For the Borough of Manhattan it was 23.7, or 17.8 per cent. of the total deaths under 1 year. The stillbirth rate was 32.5, while that for Manhattan Borough was 48.1. After the first two months, however, this favorable start was overcome and the general death rate under 1 year of age for this group of babies was 488 per thousand. Of 1,738 babies admitted at various ages under 1 year, 22.7 per cent. died before completing the first month of residence and 34.9 before completing the second month. Of all deaths, 44.3 per cent. occurred in less than one month after admission, and 68.7 per cent. in less than two months.

University Extension Work for the Prevention of Infant Mortality

DR. DOROTHY REED-MENDENHALL, Madison, Wis.: The fundamental reason for high infant mortality in the rural districts is neglect of the childbearing woman. In country districts in Wisconsin deaths from puerperal fever, birth injuries, malformations and prematurity are about one-third more common than in the cities, and we have had larger statistics of still-born children in the rural districts, caused by neglected pregnancy and labor; this is easily doubled in the country districts as compared with the cities. The community welfare work of the University of Wisconsin has been in existence a little over two years; therefore the results are too small to make very much of. I believe, however, that we are meeting a hitherto unmet need of the community, and for this reason our work is of fundamental interest. Briefly, these are the methods: An advance agent is sent ahead, and a moral or welfare survey of the community or small town, usually a town of from one thousand to five or six thousand, is made, and in that way the special needs of the community, whether hygienic, moral or social, are found out. Then the university sends out experts from the university extension staff to talk on topics that have been suggested, such as the care and physical conditions of infants; why women should so often miscarry; why the children are still-born; why there is so much suffering from injuries incidental to childbirth; why they had caked breasts, milk-leg and fevers after childbirth, and talks on the care of the mother before and after confinement, as well as the care of contagious diseases in the home.

The Relation of Gynecologic Surgery to Bad Obstetrics

DR. EDWARD REYNOLDS, Boston: Obstetric mortality is now generally low, but much of a woman's subsequent health depends on the conduct of her confinement. Poor attendance is usually followed by some degree of chronic ill health, which is sometimes subsequently remedied by a well-attended confinement. The ill effects of bad obstetrics may be either directly constitutional or the result of local injuries or infections. Bad obstetrics contributes to gynecologic surgery, chiefly tears, tubes and misplacements. Much depends on adequate care during convalescence. Obstetric care is in general much better than formerly, but there is still much room for improvement.

The Need of Hospitals for Maternity Surgical Cases

DR. EDWARD P. DAVIS, Philadelphia: The advantages of the modern hospital for cases of parturition requiring assistance cannot be denied. The risk of infection and hemorrhage are reduced to a minimum, suffering is prevented, the patient is put in condition to make a prompt and thorough recovery, and the lives and health of mother and child are conserved by all the methods of modern science. What is needed to give confinement cases adequate hospital care is an adaptation of accommodations to the means of the community. Hospital beds at a price of from five to seven dollars per week, in small wards, are usually within the reach of any man who has work. A certain number of absolutely free beds should be available for those who honestly cannot pay. These small wards should be thoroughly comfortable, the friends of the patient should have access to her at definite hours, and the patient and her husband should be made to feel that their effort to compensate the hospital are appreciated and respected. The greatest need in hospital accommodations for confinement at present is private rooms at from ten to fifteen dollars per week.

Teaching Obstetrics: Necessary Equipment

DR. W. W. CHIPMAN, Montreal: The imperative and the absolute need is for a larger and more adequate teaching service in our hospitals and dispensaries. Each and every hospital is so much the better in its adequate care of the sick by very reason of its teaching; it is thereby saved from

Chauvinism and decay. This provision of clinical service is both the duty and the privilege of the laity to bestow. Each and every lying-in hospital should, if possible, be affiliated with a teaching school. The hospital is, or should be, the student's workshop. He begins at the beginning, doing things, and it is only in, and by, such service that he gains in any sense professional wisdom. For obstetrics, all this means the lying-in hospital.

COLLEGE OF PHYSICIANS OF PHILADELPHIA

Meeting held Nov. 23, 1914

DR. JAMES E. TALLEY in the Chair

Cirrhosis of Liver and Peritoneal Tuberculosis

DRS. B. F. STAHL and NORMAN B. GWYN: A woman, aged 58 years, complained of pain in the lower left axilla. For many years she had been a steady drinker. She had been feeling poorly for about five weeks and occasionally was feverish. There was complete absence of physical signs, except a few crepitations in the left axilla. No malarial parasites could be found; the Wassermann test was negative, the tuberculin test weakly positive; the sputum was repeatedly negative for tubercle bacilli. The patient ate and slept well. A gradual wasting without pronounced anemia took place. At the end of five weeks there was distinct yellowing of the conjunctivae and enlarged veins coursing up over the thorax and down to the groins. The patient failed rapidly. Three days later swelling of the abdomen began and pain in the right side of the abdomen became marked. Four days later signs of fluid in the abdomen were distinct. At no time in the last ten days of life did it seem likely that operative measures would avail. The necropsy showed atrophic cirrhosis of liver, the organ being deeply indented, suggesting a syphilitic process. There was a small area of tuberculosis in the left upper lobe anteriorly. The interior of the abdominal wall was studded with irregular, small nodules; the mesentery studded with irregular, small nodules with hemorrhagic tops. The serous coat of the intestines had lost its gloss and a fine fibrinous layer was over all. In a good light minute tubercle-like formations were evident in abundance. The lower 8 cm. of the cecum was an immense, ulcerating, thickened mass; there were other ulcerations in the intestines, evidently tuberculous. Sections showed that the condition was tuberculous. Tubercle bacilli were found in macerated tubercles from the peritoneum.

DISCUSSION

DR. JOHN K. MITCHELL: I had under my care about four years ago a somewhat similar case, in which the fever lasted for six months. Every night, with one or two exceptions, the man had a temperature of from 102 to 103.5 F. Tests of urine, feces and blood were negative. There were numbers of crystals of uric acid in the sweat, the odor of which was so bad that the man was obliged to get up in the night and take a bath. I sent him to the country and had him sleep outdoors. After two or three weeks the temperature fell and the man recovered in six or seven months. He is now perfectly well and weighs 190 pounds. The diagnosis is still in abeyance.

DR. ROBERT N. WILLSON: Last year I saw a little girl who had what seemed to be a low grade bronchopneumonia. For two or three days her temperature was normal. Following that she would have a rise of temperature and then a return to normal. Headache was the only other symptom. This lasted for four months. Tuberculin tests were always positive, but we could not put our finger on a focus. Finally the abdomen became greatly distended. We operated and found in the center of the abdomen a large caseous tuberculous mass. This was removed with a tremendous loss of blood and the child died that night. Up to the day previous to the operation there was no suggestion of an abdominal condition, except a little tenderness over the appendiceal area.

DR. JOSEPH SAILER: The association of tuberculosis and cirrhosis of the liver is interesting. In my experience with cirrhosis of the liver not one patient out of twelve had tuberculosis. In a case of prolonged fever there was also failure to reach a definite diagnosis. All tests were negative. The patient neither wasted nor gained and had a temperature between 99 and 100 F., occasionally reaching 101. This was before the days of the Wassermann test. On the basis of the possibility of syphilis, antisyphilitic remedies were used, but without result. Another patient had a daily temperature of 100 F. During six months' observation nothing definite appeared. The woman gained about 7 pounds on a prolonged rest cure, but did not lose her fever. Prolapse of the uterus was the only definite gynecologic symptom. Dr. Clark operated and a fairly large solid ovarian tumor was removed. The patient's temperature became normal and she completely recovered her health.

DR. WILLIAM M. L. COPLIN: One point not accentuated is that in post-mortems we see an unusual type of tuberculosis in which caseation or other form of necrosis is slight or absent. The masses on the peritoneum in this case were elevated with hemorrhagic summits, often appearing almost papillomatous; the sand-grain surface of miliary tuberculosis was absent. There were one or two ulcers in the intestine, typically tuberculous. In many of these irregular forms of tuberculosis it is possible that we may find a tubercle bacillus of an unusual type. There is a fibrosclerotic change in the nodules which is very conspicuous. The appearance is almost that of complete healing, with absence of caseation, bringing forward the suggestion urged by French writers that there is a fibrogenic toxin produced by the tubercle bacillus differing from caseogenous toxin so characteristic of tuberculosis.

Typhoid Complicated by Orchitis

DR. S. H. ROSENTHAL: The patient, aged 18, passed through a mild attack of typhoid; the temperature became normal on the thirteenth day. Twelve days later the patient was seized with intense pain in the left lower portion of the abdomen. The temperature rose to 101 F., pulse rate, 120; leukocyte count, 28,000. Distinct rigidity and tenderness were present in this area and the patient vomited twice. The following morning the pain shifted to the left testicle, the abdominal pain subsiding. The testicle and epididymis were found very much swollen and tender and the scrotum inflamed, with tenderness along the vas and enlargement of the left inguinal glands. The leukocyte count gradually fell to 9,000. Twenty days after the onset of this complication an incision was made in the left testicle and pus was found. Typhoid bacilli were obtained in pure culture and were agglutinated by the patient's serum and the serum from another known typhoid case. The patient is still in the ward, the wound draining. There is no history of venereal infection. Orchitis and epididymitis are comparatively rare complications of typhoid fever, the percentage being about 0.2. Only a few more than 100 cases have been reported. Some arise from thrombosis of the spermatic veins; in a few the typhoid bacilli gain access to the epididymis and testicle by way of the vas from the urine, but in the majority of cases the source of infection is in the blood. The complication occurs most frequently between the ages of 15 and 25, appearing late in the disease or in convalescence, lasting from twelve to eighteen days and terminating in resolution, although induration and atrophy of the testicle or suppuration may occur. In the presence of suppuration there is apt to be extensive sloughing, which practically destroys the entire testicle.

DISCUSSION

DR. ALFRED STENGEL: I believe that the estimate given by the latest literature of 108 cases of this complication of typhoid fever is far below the actual number. This opinion is strengthened by the personal observation of about six cases in 350 cases of typhoid. This is a late complication, and the confusion between a gonorrheal process and one due to typhoid is, therefore, not so likely to occur as one might at first think.

DR. JOSEPH SAILER: The interesting features in this case are the pain referred to the abdomen from the very begin-

ning, and the marked leukocytosis. I have not seen a frank case of orchitis such as this is, and I have seen at least 350 cases of this complication.

The Abderhalden Test with Its Relation to Disease of the Liver

DR. JOSEPH SAILER and DR. T. G. SCHNABEL: We obtained the following results in 43 cases examined: Five cases of secondary malignant disease of the liver, all strongly positive; 2 cases of cholelithiasis, 1 strongly positive and 1 faintly positive; 1 case of cholecystitis with adhesions and jaundice, moderately positive; 5 cases of atrophic cirrhosis, all probably alcoholic, 2 moderately positive, 2 very strongly positive and 1 negative; 4 cases of passive congestion of the liver secondary to cardiorenal disease, all strongly positive; 2 cases of enlarged liver, positive; 1 case of suspected liver disease without definite symptoms, faintly positive; 3 cases of syphilitic cirrhosis with Wassermanns all positive; 1 of these positive after the injection of salvarsan; 2 cases of hypertrophic cirrhosis, both positive. One case of renal insufficiency one week after induced abortion gave a strong reaction with liver, strong reaction with thyroid and intensely strong reaction with placenta. Another case of supposed puerperal infection gave a strong reaction with placenta, but none with either liver or thyroid. In a case of suspected pregnancy, afterward proved not to be, there was no reaction with either tissue. In two cases of lobar pneumonia the serum of both showed dialyzable substances and gave a positive reaction with ninhydrin. In one case of myxedema a very faint reaction was obtained with liver substratum but no others. In one case of known pregnancy there was no reaction with liver tissue, faint reaction with thyroid, and strong reaction with placenta. In a case of malaria there was a strong reaction with liver tissue, with kidney tissue, and with thyroid tissue. In a case of multiple serositis there was a faint reaction with liver, thyroid and placenta. In a case of recurrent alopecia, which had been diagnosed by two other physicians as disturbance of the thyroid gland, there was no reaction with any substratum. On the whole, the results indicated that the reaction was positive in the majority of known cases of liver disease and occasionally positive in cases not known or supposed to be liver disease, and in which the complete demonstration of a normal liver naturally could not be made.

(*To be continued*)

Current Medical Literature

AMERICAN

Titles marked with an asterisk (*) are abstracted below.

Albany (N. Y.) Medical Annals

December, XXXV, No. 12, pp. 639-687

1 Hospital Treatment of Inebriates. T. D. Crothers, Hartford, Conn.
2 Importance of Pure Milk for Infants and Infant Feeding. H. L. K. Shaw, New York.
3 Exophthalmic Goiter. J. L. Loutfian, Coxsackie.

American Journal of Orthopedic Surgery, Philadelphia

October, XII, No. 2, pp. 201-378

4 *Histology of Bone Graft. W. E. Gallie, Toronto.
5 *Experimental Study of Osteogenesis. L. Mayer, New York, and E. Wehner, Munich, Germany.
6 *Ununited Fractures with Study of Bone Repair. G. W. Hawley, Bridgeport, Conn.
7 Treatment of Paralytic Scoliosis by Bone-Grafting. H. P. H. Galloway, Winnipeg, Canada.
8 Pott's Disease; Albee's Bone-Grafting Operation. Results in Series of Twenty-Six Cases. E. W. Ryerson, Chicago.
9 Artificial Ankylosis of Spinal Vertebra. H. B. Thomas, Chicago.
10 Architecture of Tarsus. A. Steindler, Des Moines, Ia.
11 Pathologic Report of Case of Vertebral Osteo-Arthropathy (Charcot's Disease of Spine). S. F. Jones, Denver.
12 *New Physical Sign in Certain Lesions of Lumbar Spine. L. W. Ely, San Francisco.
13 Subluxations of Atlas on Axis. C. Ogilvy, New York.
14 Report of Three Cases of Partial Luxation of Atlas on Axis. J. D. Griffith, Kansas City, Mo.

4. Histology of Bone Graft.—Experiments were conducted by Gallie with a view to determining the successive histologic changes which occur in bone transplants. In each case the periosteum was removed from the graft before it was inserted. In four experiments the grafts were autogenous and the specimens were recovered after the lapse of one, two, three and eight weeks, respectively. In one experiment the graft was autogenous, but boiled before insertion. In another experiment a piece of cat's bone and in still another experiment a piece of human bone was grafted into a dog. These experiments demonstrated that following the successful transplantation of such bone grafts the following changes occur: 1. Death of the graft. 2. Revascularization of the graft. 3. Concomitant absorption of the dead bone and production of new bone by the bone cells which invade the graft along the route of the new blood-vessels. The experiments showed no difference in the value of fresh or boiled bone as a transplant and no difference in the gross and histologic changes, incident on the introduction of autogenous and heterogenous bone grafts.

5. Experimental Study of Osteogenesis.—All four series of experiments performed by Mayer and Wehner—transplants of periosteum, subperiosteal resections, cap implantations and bone transplants—combined to emphasize the osteogenetic function of the specific osteoblastic cells of the periosteum and the inability of the adult bone-cell to form new osseous growth. Bone growth occurred in all the transplants of periosteum, and from the periosteum after subperiosteal resection; it was, however, absent in the cap experiments in which the ingrowth of periosteum had been excluded. In the bone transplants, the adult bone-cells of the graft gave no evidence of activity whereas the periosteum showed marked osteoblastic properties. Similar osteogenetic power was manifested by the transplanted endosteal cells lining the marrow cavity and the Haversian canals, provided their vitality was maintained by intimate union with the tissues of the environment.

Bone macroscopically bare of periosteum was successfully transplanted into the soft parts, not because the bone cells gave rise to new bone formation, nor because of a metaplasia of the surrounding connective tissue cells into osteoblasts, but because of adherent periosteal cells, and of living endosteal cells. The practical conclusions for the surgery of bone transplants the authors consider to be self-evident; bone should be transplanted with the periosteum; if feasible, it should be split lengthwise, so as to insure an intimate union of the endosteum with the surrounding tissues. Bone macroscopically bare of periosteum can, however, be transplanted with good hope of success if care be taken not to scrape away the adherent cells of the osteogenetic layer of the periosteum.

The authors hold that the classical conception of a complete necrosis of the bony portion of the transplant must be modified since, though the majority of the transplanted bone cells necrose, numerous cells can maintain their vitality until the graft has become vascularized. These cells, however, give no evidences of osteogenesis. The process by which the necrotic bone of the transplant is replaced by living bone consists not only in the usual sequence of lacunar absorption and subsequent bone apposition, but in a "creeping replacement." In this process the young bone cells before they have assumed the adult form and before the bone has become lamellar in structure, show evidences of direct cell division, and of power to absorb necrotic bone and form new bone. The living osseous tissue advances into the old by the intercellular deposit of bone, also probably by a direct advance of the young bone cells in the old lacuna.

6. Ununited Fractures with Study of Bone Repair.—During the last five years Hawley has observed fifty-three cases of ununited fracture in a total of 1,200 cases of fractures. As a result of this experience, the following conclusions are drawn. Accurate approximation or near approximation, offers the most effective prevention of imperfect union, by lessening the distance to be bridged by capillary growth and bone-cell invasion. Gross hemorrhage interferes with frac-

ture repair, and it is a question whether extensive extravasation is not an indication for evacuation. The periosteum acts to protect the intrinsic process of repair from connective tissue intrusion from without. It also plays a small part, although not always a necessary part, in repair, by reason of its blood supply to the cortex and the bone cells nested around these periosteal capillaries. The promotion of bone regeneration by increasing the amount of calcium in the diet Hawley regards as of doubtful value. During fracture repair the normal demand for calcium is reduced; the only increase is limited to the site of fracture. Whatever influence the organs of internal secretion may have on bone nutrition, the nature of the control is unknown, and there is no evidence that gland feeding favors or retards callus formation.

Hawley urges that simple methods of treating delayed union should precede operative intervention, unless obvious reasons exist for early operation. Bone transplantation is the operation of choice, because buried metal frequently retards the healing process. It is doubtful if the freshening of the fracture surfaces has much merit in itself, for the secondary repair is less likely to be as vigorous as the first. So-called fibrous union may be due to defective vascular communication between fragments, or faulty function of the calcium depositing cells. In Hawley's opinion it is more often the latter. Massage, as it is commonly understood and practiced, Hawley says, should never be used in the treatment of ununited fractures.

12. **New Physical Sign in Lumbar Lesions.**—In various lesions of the lumbar spine, inflammatory and traumatic, Ely found that if the patient be laid on his face, when his knee is flexed his pelvis on that side will rise from the table. The exact reason for this phenomenon is not given, but it helps to differentiate lumbar from sacroiliac lesions, having possibly in the former the same value as Kernig's sign has in the latter.

American Journal of Roentgenology, Detroit

September, I, No. 11, pp. 399-447

15 Roentgen Interpretation of Intestinal Conditions. A. J. Quimby, New York.
16 Chronic Intestinal Stasis—Fluoroscopic and Roentgen Ray Diagnosis in Light of Operative Findings. W. S. Bainbridge, New York.
17 *Treatment of Acute Roentgen Ray Dermatitis. W. J. Dodd, Boston.
18 Diseases of Accessory Sinuses. A. W. George, Boston.

17. Abstracted in THE JOURNAL, Oct. 10, 1914, p. 1021.

Annals of Ophthalmology, St. Louis

October, XXIII, No. 4, pp. 605-786

19 Case of Chronic Sporotrichosis of Eye. A. J. Bedell, Albany, New York.
20 Acquired Symmetric Opacities of Cornea of Unusual Type. G. F. Libby, Denver.
21 Blepharochalasis. Report of Two Cases. E. Stieren, Pittsburgh.
22 New Operation for Capsulomuscular Advancement Combined with Partial Resection. S. L. Ziegler, Philadelphia.
23 Trephine Operation for Glaucoma Late Infection from an Acute Conjunctivitis. M. Standish, Boston.
24 Tuberculosis of Bulbar Conjunctiva. G. F. Libby, Denver.
25 Case of Total Coloboma of Optic Nerve Entrances. B. Chance, Philadelphia.
26 Report of Traumatic Paralysis of Both External Recti. F. E. Woodruff, St. Louis.
27 Treatment and Indications for Operation in Glaucoma Simplex. H. S. Gradle, Chicago.

Archives of Pediatrics, New York

November, XXXI, No. 11, pp. 801-880

28 Three Cases of Gonococcus Septicemia with Arthritis Following Scarlet Fever. M. Nicoll, Jr., New York.
29 Pyloric Stenosis in Infancy. Report of Three Cases. M. S. Reuben, New York.
30 University Children's Hospital of Vienna. A. Levinson, Chicago.
31 Case of Hypernephroma. L. Fischer, New York.
32 *Use of Stoeltzner's Casein Calcium Milk in Treatment of Summer Diarrheas of Infancy and Early Childhood. W. L. Rost, New York.

32. **Use of Casein Calcium Milk in Treatment of Summer Diarrhea.**—During the summer of 1914 Rost used this milk in the treatment of fifty-six cases of summer diarrhea, no patient being ill less than three days. Age varied from 3½ months to 2½ years. Many of the children were rachitic, anemic, poorly nourished, underdeveloped and underweight. The original formula was adhered to, as a rule; dextri-maltose was rarely added before the third day; in about 50 per cent. of the cases, cereal decoction was employed instead of water; small amounts were given at four-hour intervals; water *ad libitum* if necessary; the total quantity of food was increased from 2 to 4 ounces daily, depending on the condition and age of the child. It was well taken by all except one. This milk was given for periods of time varying from four days to several weeks. No vomiting occurred. All cases showed improvement in about four days, the stool in most children assuming a yellowish color, semisolid, one or two movements daily. About 40 per cent. gained in weight and 21 per cent. remained stationary; in 30 per cent., the weight could not be observed on account of the very irregular attendance of the mothers.

Rost is convinced that casein calcium milk employed in dyspepsia (summer diarrhea) is productive of results rarely attained with the older methods of treatment. On account of the simplicity of its preparation and inexpensiveness, it is particularly useful in the management of nutritional disturbances applying to the outpatient departments for treatment. It may readily be used in those nutritional disturbances in which Finkelstein and Meyer's protein milk is indicated, but cannot be employed on account of its expense or taste.

Arizona Medical Journal, Phoenix

November, II, No. 10, pp. 7-26

33 Toxic Effects of Certain Drugs on Eyes and Their Clinical Manifestations. D. F. Harbridge, Phoenix.
34 Present Status of Tuberculosis of the Eye. H. H. Stark, El Paso, Tex.

Arkansas State Medical Society Journal, Little Rock

December, XI, No. 7, pp. 155-178

35 Medical Profession and Public Health. W. R. Bathurst, Little Rock.
36 *Epidemic of Small-Pox. F. B. Young, Little Rock.
37 Early Recognition of Diseased Tonsils and Adenoids. W. T. McCurry, Little Rock.

36. **Epidemic of Small-Pox.**—The epidemic Young reports was one of the hemorrhagic and purpuric type which existed in Elm Springs Township, Washington County, Ark., during January and February, 1914. The interesting points in this epidemic are its high percentage of mortality, 90 per cent. of all unvaccinated adults, the recovery of all children afflicted, and the very evident effect that age had on the prognosis of the disease. The younger the child, invariably, the milder the attack. A successful recent vaccination in all cases was an absolute protection. Another point of interest in this epidemic lies in the fact that it came from old Mexico.

Boston Medical and Surgical Journal

December 3, CLXXI, No. 23, pp. 839-878

38 Medical Problems in Education. Responsibility of Medical Profession. T. F. Harrington, Boston.
39 Duty of State to Psychopathic Hospital. W. Channing, Brookline.
40 Progress of Psychopathic Hospital on Prophylactic Side of Mental Hygiene. E. E. Southard, Boston.
41 After-Care Program and Results of Psychopathic Hospital, 1913-14. A. W. Stearns, Boston.
42 Economic Side of Psychopathic Social Service. M. C. Jarrett, Boston.
43 High-Grade Defectives at Psychopathic Hospital During 1913. T. H. Haines, Boston.
44 Genetic Factors in One Hundred Cases of Psychoneurosis. D. Gregg, Boston.
45 Point Scale: New Method for Measuring Mental Capacity. R. M. Yerkes and J. W. Bridges, Boston.

December 10, No. 24, pp. 879-914

46 *Action of Lecithin on Tubercle Bacilli and Their Relation to Experimental Tuberculosis. E. Zueblin and F. Proescher, Baltimore.
47 *Variations in Sensory Threshold for Faradic Stimulation in Psychopathic Subjects. G. P. Grabfield, Boston.
48 *Experience with Lange Colloidal Gold Test in One Hundred and Thirty-Five Cerebrospinal Fluids. H. C. Solomon and H. O. Koetod, Boston.
49 Cases of Symptomatic Psychoses of Cardiorenal Type. F. E. Williams, Boston.

50 Margin of Error in Psychopathic Hospital Diagnosis. E. E. Southard and A. W. Stearns, Boston.
51 *Systematic Control of Salvarsan Therapy Based on Rapidity of Arsenic Excretion. H. M. Adler, Boston.

46. Abstracted in THE JOURNAL, July 18, 1914, p. 269.

47. **Variations in Sensory Threshold for Faradic Stimulation.**—The new Martin test (1908 et seq.) for variations in the sensory threshold for faradic stimulation has been used by Grabfield in an orientation study on 135 psychopathic subjects, ranging from the psychoneuroses to cases of coarse brain disorder. Repeated observations have been made in many cases. He found that the faradic threshold in psychopathic subjects of almost all kinds tends to be high, and in fact averages 223 beta units, as against 140, considered to be the highest range of normal subjects under ordinary circumstances, and 175, considered to be definitely pathologic. The average threshold for alcoholic cases was 252, and among alcoholic cases the polyneuritic or Korsakoff cases ran highest. On withdrawal of alcohol and in convalescence the threshold falls, and the method may even have practical value in gauging the degree of progress toward recovery in the delirium tremens group. The paranoidal forms of dementia praecox have a normal threshold, whereas those classed as catatonic and hebephrenic have pathologically high thresholds. The hebephrenic cases tested (two in number) showed some of the highest thresholds calculable (760). Eight catatonic cases averaged 232 (paranoid 131). The manic phase of manic depressive insanity shows a normal threshold, the depressive phase a pathologically high threshold. The psychoneurotics seem to have normal thresholds—hence there may be an immediate practical value diagnostically, when the diagnosis is in doubt as against the frank psychoses.

48. **Experience with Lange Colloidal Gold Test in Cerebrospinal Fluids.**—Solomon and Koefod tested 135 cerebrospinal fluids. The cases of general paralysis give fairly constant and characteristic reactions. The characteristic paretic reaction was typically given in 20 out of 25 cases. As they were not certain in many of the cases whether the diagnosis was paresis or cerebrospinal syphilis, the authors are unable to draw any conclusions from these tests as to the value of the method in differentiating the two. Of twelve cases of congenital syphilis, only one gave a marked reaction and that a case of juvenile paresis. There were 33 cases giving positive Wassermann reactions which were diagnosed as other than syphilis of the central nervous system. Of these, 10, or 30.3 per cent., gave some reaction in the syphilitic zone, mostly very slight. Of 53 cases giving a negative Wassermann reaction and no other indication of syphilis, 18, or 33.9 per cent., gave reactions mostly in the syphilitic zone. The authors maintain that a reaction in the syphilitic zone in cases of syphilitics does not necessarily argue syphilitic involvement of the central nervous system, all other signs being negative. It would seem to offer a differentiation of tuberculous meningitis, and is here at times more valuable than any other test. Four cases of tuberculous meningitis gave reactions not to be confounded with syphilitic disease.

51. **Salvarsan Therapy Based on Rapidity of Arsenic Excretion.**—The determinations made by Adler were 153 in number. The arsenic was found absent in the blood as early as twenty-four hours after intravenous injection. The majority of cases were found to be arsenic-free in from thirty-six to forty-eight hours after salvarsan injection. The longest interval after injection that arsenic was recovered from the blood was sixteen days in one case.

Bulletin of the Medical and Chirurgical Faculty of Maryland, Baltimore

November, VII, No. 5, pp. 63-73

52 Foot and Mouth Disease. J. Ruhrah, Baltimore.

Cleveland Medical Journal

October, XIII, No. 10, pp. 677-756

53 Sympodia. N. W. Ingalls, Cleveland.
54 Pendulous, Pedunculated and Sessile Tubercles and Masses in Serous Cavities in Man. Report of Three Cases. J. H. Hewitt, Cleveland.
55 Flexible Metal Splint Adaptable to Any Angle of Knee or Elbow, F. C. Herrick, Cleveland.
56 Observations Noted in One Hundred Cases of General Paralysis of Insane in Married Men, Their Wives and Children. A. G. Hyde, Cleveland.
57 Research Needs and Clinical Opportunities. N. W. Ingalls, Cleveland.

November, No. 11, pp. 757-836

58 *Fundamentals in Infant Feeding. M. Ladd, Boston.
59 Typhoid in Cleveland in 1913. R. J. Collins and R. G. Perkins, Cleveland.
60 *Proteid Content of Cerebrospinal Fluid. O. P. Bigelow, Cleveland.
61 Elimination of Speech and Voice Defects. B. Cadwallader, Cleveland.
62 Report of Case of Optic Atrophy Following Wood Alcohol Poisoning. S. S. Quittner, Cleveland.

58. **Fundamentals in Infant Feeding.**—That the symptoms of indigestion show the cause, Ladd says, is true to a limited extent only. Fats, proteins and carbohydrates may all produce the same symptom-complex, for the reason that an indigestion caused by any one element, if uncorrected, results in a disturbance in the metabolism of all the elements. The general symptom-complex is vomiting or regurgitation, gas in the stomach or intestines with or without discomfort, failure to gain, or loss in weight, anorexia, fever or subnormal temperature, loose and undigested stools or constipation.

In indigestion due to fat, the vomitus is generally creamy and sour, with a strong odor of butyric acid. The examination of the stools shows fat curds, and soap stools which may be dry and crumbling or like clay. In severe cases they are oily.

In indigestion due to carbohydrates, which generally is associated with fat indigestion, if long continued the vomitus becomes more watery, the stools are acid and scalding, spongy or feathery, and show undigested starch with iodin. In protein indigestion the vomitus is cheesy, the stools contain tough curds. Putrefaction is especially liable to occur in such cases with foul stools and temperature. Mucus is simply a sign of irritation and may occur in the stools in all forms of diarrhea and indigestion. If present in large amounts and associated with continued temperature it generally means an infectious process. The presence of blood, pus and fever invariably indicates infection. Green stools generally represent the severer forms of diarrhea, which may or may not be infectious. They occur in all forms of diarrhea and infections, but the color is not important in the diagnosis of the cause. These points, Ladd states, should be borne in mind in the treatment of these conditions.

60. **Protein Content of Cerebrospinal Fluid.**—An analysis of the results obtained from 440 tests for proteins in the spinal fluid has convinced Bigelow that the determination of proteins alone is not very decisive in diagnosis, unless there is at least a trace of globulin or a large trace of total protein, when a syphilitic or parasyphilitic disease is indicated. Two rather striking points brought out are the large amount of globulin found in cases of paresis, and of albumin in many cases of senile dementia.

Taken in combination with physical signs and the results of other tests, however, Bigelow agrees that the protein estimation has considerable corroborative value. There are, too, certain conditions under which it is especially valuable, due to the fact that in syphilitic and parasyphilitic disease of the central nervous system it is much less subject to variation than are the other pathologic constituents of the cerebrospinal fluid, the cellular increase and complement-fixing substance.

In five cases of convulsive seizures in paresis Bigelow found a marked decrease in the cell counts, in three of them to the normal limit. But the protein does not show a corresponding diminution; there is even an increase, in most cases, which serves as a control from a diagnostic standpoint, on the cellular decrease. It is not very unusual to find a slight yellow tinge in the fluid from cases of paresis, and these yellow fluids always give very marked protein reactions. This color and increase of protein content are both explained by Bigelow to be due to slight hemorrhages on the surface of the brain.

Delaware State Medical Journal, Wilmington

November, V, No. 11, pp. 1-26

63 Carcinoma of Uterus. H. J. Stubbs, Wilmington.
64 Case Resembling Aphthous Fever. W. Linn, Wilmington.

Illinois Medical Journal, Chicago

November, XXVI, No. 5, pp. 487 566

65 Advantages and Disadvantages of Smith's Intracapsula. Cataract Operation. W. L. Noble, Chicago.
66 Treatment of Senile Cataract by General Practitioner. W. A. Fisher, Chicago.
67 Indications for Operative Interference in Glaucoma. H. S. Gradle, Chicago.
68 Inheritance with Reference to Eye and Ear. J. C. Fisher, Decatur.
69 Tonsil Removal by Knife Dissection. O. T. Freer, Chicago.
70 Cases of Interdependence of Otolaryngology, Rhinology and Dentistry. J. C. Beck, Chicago.
71 Does Ophthalmic Science in United States Demand an Endowed School of Refraction? J. W. Smith, Bloomington.
72 Function of Faucial Tonsils and Indications for Their Removal. C. F. Burkhardt, Effingham.
73 Topography of Larynx. J. A. Cavanaugh, Chicago.
74 Recognition of Chronically Infected Faucial Tonsils. G. E. Shambaugh, Chicago.
75 Importance of Early Treatment of Strabismus in Infants. W. R. Fringer, Rockford.
76 Prognosis in Squint. T. Faith, Chicago.
77 Duodenal Semistasis, Principal Factor in Auto-Intoxication, Clinical Findings, Etiology and Diagnosis. C. E. Howard, Lewistown.
78 Strongyloides Intestinalis. Report of Case. H. C. Blankmeyer, Springfield.

Journal of Medical Research, Boston

November, XXXI, No. 2, pp. 177-330

79 Reliability of Dogs as Subjects for Experimental Nephritis. H. Dayton, New York.
80 *Pathology of Thrombo-Angeitis Obliterans. L. Buerger, New York.
81 Endotrypanum of Hoffman's Sloth. S. T. Darling, Ancon, C. Z.
82 *Anaphylaxis and Its Relationship to Immunity. F. B. Gurd, Montreal.
83 Study of Growth of Normal Mouse Carcinoma and of Mouse Carcinoma with an Experimentally Decreased Virulence. O. Ishii and L. Loeb, St. Louis.
84 *Experimental Polyneuritis. W. R. Ohler.
85 *Chicken as Possible Typhoid Carrier. O. W. H. Mitchell and G. T. Bloomer, Syracuse, N. Y.
86 Early Aneurysm of Aorta. Report of Case. J. J. Ower, Montreal.
87 *New Medium for Cultivation of Chick Tissues in Vitro with Some Additions to Technic. H. F. Smyth, Philadelphia.
88 *Interrelationship of Dry Pleurisy, Pleurisy with Effusion and Empyema. C. Floyd, Boston.
89 Experimental Arterial Disease in Rabbits. G. P. Denny and C. Frothingham, Jr., Boston.
90 *Nature and Importance of Kidney Lesions in Psychopathic Subjects. E. E. Southard and M. M. Canavan, Boston.
91 Small Kidney, with Special Reference to New Formation of Tubules. E. D. Simpson, Rochester, Minn.
92 *Pathologic Anatomy of Pancreas in Diabetes. R. H. Major, San Francisco.

80. **Pathology of Thrombo-Angeitis Obliterans.**—An acute inflammatory stage according to Buerger is an initial manifestation of the pathology of thrombo-angeitis obliterans. Certain purulent foci are developed, strongly suggesting the presence of some specific toxin, or, more probably, some microbial agent. The destructive influence of these foci is evidenced in their action on the angioblasts, whose true purpose is thwarted, the result being the elaboration of a morphologic complex, distinctive and characteristic for the disease. Just as in tuberculosis and doubtless in Hodgkin's disease, certain well-known structural products represent the specific reaction of the tissues to some organism, so here, too the changes are absolutely typical and diagnostic. Besides these changes, the production of aseptic blood clot plays a part in the development of the occlusive tissue; while the infiltration of the media and adventitia makes for the adhesive fibrosis in the deep vessels, and the distinctly palpable products of periphlebitis in the subcutaneous veins. The change of the acute into the healed connective tissue stage is rapid, a type of occlusion resulting which has for a long time been regarded as due to an "endarteritis obliterans."

82. **Anaphylaxis and Its Relationship to Immunity.**—Experiments were performed by Gurd in the hope of proving the possibility of immediate symptoms of intoxication following the introduction of transferred serum and antigenic protein without an intervening period of time. The fact that it has been possible to induce fatal reactions in this manner indicates that the fixation of receptors is not an essential step in the phenomena of transferred anaphylaxis. These experiments proved a period of incubation is not necessary in order that animals may become passively hypersensitive. The possibility of immediate transferred anaphylactic shock in Gurd's opinion indicates that the theory of parenteral digestion with liberation of toxic split products is the most reasonable explanation of the phenomenon of anaphylaxis.

The blood serum of "immune" animals contains anaphylactizing substances. Unless the immunity or insusceptibility of such animals be due to a purely cellular tolerance or other change, it should be possible to show that the serum of such animals contains substances capable of rendering sensitive animals immune. That this is the case was proved by a series of experiments in which it was shown that by varying the quantity of transferred serum introduced normal animals may be rendered either sensitive or immune. Similar effects of sensitization and immunization can likewise be produced when the transferred serum and the intoxicating dose of antigenic protein are injected simultaneously or immediately following one another. Thus is it proved that cellular fixation or other alteration in the introduced "antibodies" is not an essential feature of these reactions.

84. **Experimental Polyneuritis.**—When fed on an exclusive diet of white bread, whether with or without yeast Ohler noted that fowls develop a definite polyneuritis. When fed on an exclusive diet of whole wheat bread fowls remain perfectly well. To say, then, that any exclusive diet may cause symptoms of polyneuritis is not true to fact. Apparently, there is present in whole wheat bread not present in white bread some substance or substances essential to the health of the organism. In other words, it would seem that in the relation between whole wheat flour and highly milled white flour we are dealing with the same problem as in the relation between unpolished and polished rice. This problem arises, however, only when the diet is restricted and consists almost exclusively of white flour or polished rice, as the case may be.

85. **Chicken as Possible Typhoid Carrier.**—The work done by Mitchell and Bloomer seems to show that the chicken is highly resistant to the typhoid organism. It not only fails to take the disease, but also it cannot be made a carrier either by feeding the organism or by intravenous inoculation.

87. **Cultivation of Chick Tissue in Vitro.**—When combined the medium used by Smyth consists of egg albumin, 25; trypsinized peptone, 0.25; agar agar, 0.75; Ringer's solution, 74.

88. **Interrelationship of Dry Pleurisy, Pleurisy with Effusion and Empyema.**—Acute dry pleurisy, pleurisy with effusion and empyema Floyd claims to be steps in one process. The extent of pleural reaction is controlled by the virulence of the infection and body resistance. When the invading organism is one that excites little chemotaxis, pleurisy with or without an effusion will result, but if chemotactic action is profound and the elaborated toxin not too destructive, empyema results.

90. **Kidney Lesions in Psychopathic Subjects.**—In the series of 100 necropsies reported on by Southard and Canavan, no instance of normal kidneys was found. There were thirty-nine instances of acute renal disease and 11 of these complicated by a background of chronic lesions. There were 35 instances of chronic lesions. Clinically, among 65 cases examined, albuminuria was found in 25 (38 per cent.), and cylindruria in 18 (28 per cent.). The specific gravity went below 1.015 at times in 18 cases (28 per cent.).

Clinically, there were 10 instances of edema, probably either caused or favored by the renal condition (four of the 10 cases showed cardiac disease also). Clinical records show 19 instances of seizures or convulsions of some sort, but it is not clear how many of these can be regarded as renal. Clinical records also indicate that 23 of the 100 cases were regarded in life as more or less severe cardiac cases.

Of the females examined, 26 (or 52 per cent.) had borne one or more children. Thirty-two of the 100 patients were emaciated at death.

The most prominent gross lesion in the series was chronic interstitial nephritis, which occurred in 42 cases. Microscopically, chronic interstitial nephritis was found not only in these 42 cases, but also in 24 other cases (66 per cent.). In 33 cases chronic interstitial nephritis was not only marked in the gross but was the only significant kidney finding microscopically. Plasma cells were never found in such quantity as to suggest acute interstitial nephritis, but were found in 42 per cent. of the series. Thirty-eight of these 42 plasma cell cases showed the plasma cells distributed chiefly about the glomeruli. Eleven cases over 26 but under 50 years of age yielded plasma cells, the same percentage as did the total series. The occurrence of plasma cells in the kidneys of general paretics is worthy of note by reason of their constant occurrence in the brain. Seventeen of 30 paretics in this series showed plasma cells in the kidney (56 per cent.). Sixteen of the 17 paretics showed the plasma cells in the periglomerular region, while one showed them in a subcapsular zone. Seven of the whole series of 30 paretics had seizures; 5 of these seizure cases showed periglomerular plasma cells, one showed no chronic lesion except general fibrosis and one was a case of acute parenchymatous nephritis without chronic lesion. But 3 of these 7 cases showed casts and these only in one-tubule type (descending loop of Henle).

Twelve other non-paretic cases which had seizures or convulsions of various sorts failed to show plasma cells in the kidneys, but in eight instances did show casts, although always confined to a single-tubule type (six times in the descending loop of Henle). Seventy-three cases showed casts in one or more types of tubule; 50 cases in one type of tubule only (forty in the descending loop of Henle); 14 in two-tubule types; 7 in three-tubule types; and 2 in four-tubule types. Sixty-three of these cast-bearing cases showed the casts in the descending loop of Henle. Glomerular tuft changes of a serious nature occurred in 51 cases and there were indications of disease in 13 others (besides two acute lesions). Changes in the glomerular capsule were far less in number, being of a serious nature in but 17 cases (slight or infrequent in 10 others). Cast deposits occurred in 8 cases under 50 years of age without evidence of glomerular change.

92. **Anatomy of Pancreas in Diabetes.**—Fifty-four per cent. of the cases examined by Major showed normal islands of Langerhans. Fibrosis of the islands of Langerhans was present in 46 per cent. of the cases, but no more marked than in non-diabetic cases. In 46 per cent. of the cases there was some hyalin degeneration of the islands of Langerhans. This degeneration in only one case involved a very large number of islands. All of the cases showing hyalin degeneration also presented some fibrosis, and vice versa. The hyalin degeneration in the diabetic series was the most striking lesion present, and was encountered in only one case of the non-diabetic series. This non-diabetic case, however, showed more striking and extensive hyalin degeneration than any of the diabetic series. All the lesions of the islands found in diabetic cases were also encountered, and in some to a more marked degree in non-diabetics.

Kentucky Medical Journal, Bowling Green

November 15, XII, No. 22, pp. 703-736

93 Present Status of Rectal Surgery. G. S. Hanes, Louisville.
94 Nitrous Oxid-Oxygen Anesthesia. W. H. Long, Louisville.
95 Some of the Dangers of Too Greatly Restricted Diet in Typhoid. J. R. Morrison, Louisville.
96 Twilight Sleep. H. A. Davidson, Louisville.
97 *Uterine Myomata and Malignancy. J. G. Gaither, Hopkinsville.
98 Who Should Do Surgery? A. M. Vance, Louisville.

97. Abstracted in THE JOURNAL, Oct. 17, 1914, p. 1417.

Lancet-Clinic, Cincinnati

November 28, CXII, No. 22, pp. 575-600

99 Watkins-Wertheim-Duhrssen Operation Against Other Methods in Treatment of Uterine Prolapse. C. T. Souther, Cincinnati.
100 Medical Department in Court. T. W. Blackburn, Omaha.
101 Military Medicine. J. D. Spelman, Cincinnati.
102 Abscess Originating in Pilonidal Sinus. L. J. Krouse, Cincinnati.

December 5, No. 23, pp. 601-626

103 What the Physician Should Expect of Laity and What Laity Should Expect of the Physician. A. D. Willmoth, Louisville, Ky.
104 Tumors of Urinary Bladder. E. O. Smith, Cincinnati.
105 Some Work Seen in Europe Just Before the War. J. Y. Welborn, Evansville, Ind.
106 Korsakoff's Syndrome or Polyneuritic Psychosis. R. Ingram, Cincinnati.

Laryngoscope, St. Louis

November, XXIV, No. 11, pp. 901-961

107 Preturbinal Operation on Maxillary Sinus. R. H. Skillern, Philadelphia.
108 Extracts and Thoughts from Sinus Classic. J. J. Hurley, Boston.
109 Relation of Tonsil to Thyroid Disease. B. R. Shurly, Detroit.
110 Suspension Laryngoscopy in Children. R. Levy, Denver.
111 Routine Use of Bronchoscope in Out-Patient Department. R. F. Ridpath, Philadelphia.
112 Environmental Surgery of Oto-Laryngology. J. F. Barnhill, Indianapolis.
113 Hyoscin and Morphin as Preliminary to Local Anesthetics. L. M. Hurd, New York.

Medical Record, New York

December 5, LXXXVI, No. 23, pp. 951-992

114 Precancerous Diseases and Precancerous Lesions, Especially in the Breast. J. Ewing, New York.
115 Heredity and Predisposition in Life Insurance. A. B. Wright, Hartford, Conn.
116 Chronic Prostatitis and Its Treatment by General Practitioner. W. J. Robinson, New York.
117 Question of Intestinal Stasis. W. L. Barber, Jr., Waterbury, Conn.
118 Twilight Sleep in Practice. W. H. W. Knipe, New York.
119 "Back to the Soil." J. North, Toledo, O.
120 New Combined Head-Mirror and Face-Protector. M. Unger, New York.

December 12, No. 24, pp. 993-1034

121 Management of Pneumonia. S. Baruch, New York.
122 *Progressive Lenticular Degeneration. Report of Case. C. E. Nammack, New York.
123 *Dystonia Musculorum Deformans. Report of Case. H. Climenko, New York.
124 Extrapyramidal Hemiplegia. Report of Case. A. Gordon, Philadelphia.
125 Case of Compression Fracture of Upper Extremity of Tibia. A. C. Burnham, New York.
126 Diathermic Treatment. A. D. Rockwell, Flushing.
127 Case of Herpes Buccalis Recidivus of Fournier-Emery Type. D. W. Montgomery, San Francisco.
128 Two Cases of Retropharyngeal Abscess. B. A. Fedde, Brooklyn.

122. **Progressive Lenticular Degeneration.**—Nammack's patient was a male, the last of seven children. The family history was negative as to gout, rheumatism, syphilis, alcoholism or nervous affections. He had the usual diseases of childhood and at the age of 5 years he lost his speech and the power of walking, being obliged to creep around, but he was able to go to school at the age of 10, and left six years later in the fourth grade. He was always near the head of his class and liked to study. He had a bad temper and would get into quarrels with the other boys. He left school because his left arm began to shake so that he could not hold objects in it. After he left school he remained at home.

The first symptom of the disease occurred when he was 6 years old, when it was noticed that his left hand trembled considerably and that his right leg slowly turned in. The foot finally got into such a condition that he walked on the side of the foot and had to catch hold of bed-posts, etc., to support himself. There was no history of epileptic fits or periods of unconsciousness. Gradually, the tremor of the hand became more aggravated, the condition of the foot became worse and his speech became so nasal in quality that it was difficult to understand him. When he started to do anything he had to wait a few minutes and then quickly arose: as soon as he got up he would start swaying around and would have to take hold of some support to pull himself along. If he was in the open, without support, he would throw himself forward and drag or slide his feet. After he started walking he got along very well unless he stopped. The muscles of the arm and trunk were remarkably well developed.

The patient's facial expression was fixed; the mouth was large and drawn, and when walking or doing any form of exercise he protruded his tongue. He understood everything that was said to him and usually was in a jolly mood, although he had a bad temper. His intelligence was about on a par with that of a boy of 12 or 13. He was able to dress and to feed himself; only it took him longer. His condition had apparently remained unchanged for several months. Swallowing was normal. The tremor of the hand was coarse. The grip was good; the knee and ankle jerks were exaggerated; sensations appeared to be normal. The Wassermann test was negative. There was atrophy of the muscles of the right leg, hip and calf, with compensatory hypertrophy of the other muscles of the body.

123. **Dystonia Musculorum Progressiva.**—The subject of the case cited by Climenko was a girl 11 years old of Jewish parentage, the third child, born at full term after a perfectly normal labor. She was breast fed and began to walk and talk at about the age of 18 months. The bowels had always been irregular; her appetite was poor and she was frequently restless in her sleep. She played a good deal out of doors and was considered bright at school. When she was 9½ years of age she had an attack of whooping-cough. About a week or two after the attack she began to complain of weakness in her left lower leg. A little later the foot turned outward while running or walking quickly. The weakness gradually extended upward, and her knee gave way. Plaster-of-Paris applied to the knee joint seemed to relieve her a good deal. A few weeks later she began to complain of weakness in the opposite leg, and soon the left hand became involved, and with each attempt to use the hand it began to tremble. Similar tremors were also noticed in the lower extremities. She complained of no pain or paresthesias of any kind. The condition progressed steadily, and about a year after the onset of her symptoms she was no longer able to walk.

In the recumbent posture the patient showed a slight worm-like tremor of all the extremities, more pronounced on the right side. It somewhat resembled an athetosis but possessed a characteristic of its own, being somewhat irregular and worm-like and entirely lacking in rhythm. In the prone position there seemed to be a characteristic pose consisting of flexion of the right knee, with extension and external rotation of the right hip, and outward rotation of the left foot. There was a slight kyphosis in the lumbar region which became more pronounced in the sitting posture. On standing, a kyphoscoliosis was equally pronounced. The trunk assumed an acute angle, the pelvis varying in its position with movement. The patient could stand only with support. On standing, the right foot was at an unusual angle with the lower leg, the right knee assuming almost the shape of a genu recurvatum. The patient was unable to walk unsupported, a marked feature being a peculiar torsion of the trunk on the pelvis, the latter being thrown out of a normal angle relation with the trunk. On trying to walk there were numerous unskilful and disharmonious movements through extremities and trunk; to correct these movements, the patient seized her lower extremity at the joint, forcing it into proper position. The right hamstring and leg muscles were in a state of hypertonicity; almost rigidity. Both quadriceps groups and the left peroneal group were in a state of complete atonia. The hips were hyperflexed on the abdomen. Due to the atony of the flexors digitorum of the right hand, the fingers could be hyperflexed to such a degree that on dorsal flexion (really extension) of the fingers, they could be brought to an acute angle with the dorsum of the hand.

Both knee jerks were diminished, and the ankle jerks were obtained with difficulty. The Babinski andOppenheim signs were absent. The abdominal reflexes were present. All the various sensibilities were intact. The cranial nerves were normal. The heart, lungs and abdominal viscera showed no abnormality. The patient was able to write with difficulty. The electric reactions showed no qualitative changes, a hyperexcitability, however, was obtained in the hypertonic muscles. The urine showed a slight excess of indican, but was otherwise negative. The psyche was perfect. The roentgenogram showed that the neck of the left femur was shorter and thicker than the right and the sacrum was turned to the left. There was no change in the density of the bone.

Modern Hospital, St. Louis

December, III, No. 6, pp. 351-408

129 Relationship of Poverty and Sickness and of Both to Hospital. S. M. Johnson, London.
130 Feeding the Hospital—The Food. L. Graves, Cleveland.
131 Need of Better Hospital Equipment for Medical Men. E. F. Stevens, Boston.
132 How an Average Community Cares for Its Sick. J. R. Shilliday, New York.
133 Grouping of Medical Men for Office and Hospital Practice. P. E. Truesdale and R. W. French, Fall River, Mass.
134 New Era for General Memorial Hospital. A. M. Lawson.

New Mexico Medical Journal, Las Cruces

November, XIII, No. 2, pp. 41-82

135 Intussusception in Children. J. Vance, El Paso, Tex.
136 Cases with Erroneous Surgical Diagnosis. H. R. McGraw, Denver.
137 Abdominal Diagnosis with Special Reference to Pain. W. R. Lockett, Carthage.

December, No. 3, pp. 83-114

138 Observations of Country Physician. J. W. Laws, Lincoln.
139 Infection with Cercomona Hominis. E. C. Prentiss, El Paso, Tex.
140 Proper Treatment of New Growths. W. W. Waite, El Paso, Tex.

New York Medical Journal

December 12, C, No. 24, pp. 1145-1192

141 Abnormal Mental States. H. M. Friedman, New York.
142 Changing Tendencies in Disease. J. R. Wiseman, Syracuse.
143 *Treatment of Pectus Excavatum (Funnel Breast). J. M. Taylor, Philadelphia.
144 *Radium and Mesothorium in Conjunction with Roentgen Therapy. R. H. Boggs, Pittsburgh.
145 Some New Potentialities Associated with Electric Energies. T. D. Crothers, Hartford, Conn.
146 *Hemiplegia Complicating Thoracic Aneurysm. L. N. Boston and L. C. Rummage, Philadelphia.
147 Colon Bacillus Infection in Middle Ear Disease. D. S. Dougherty, New York.
148 Puerperal Sepsis. J. N. Upshur, Richmond, Va.
149 Pneumococcus Peritonitis. L. M. Kahn, New York.

143. **Treatment of Pectus Excavatum (Funnel Breast).**—The plan adopted by Taylor is to force the chest to expand and the ribs to rise to a normal level; and to do so often enough to overcome the rigidities, and allow the posterior muscles of the back and shoulder girdle to attain sufficient strength to maintain the heretofore dropped and collapsed chest in a normal position. He directs the patient to clasp hands behind and place them just below the shoulder blades, then to pull apart one against the other, extending both steadily downward, as far as possible, maintaining both traction and extension with increasing force, and to hold them at the end of full downward extension an appreciable time—a few seconds.

As an important detail, first the right hand clasps the metacarpal bones of the left hand, the fingers of the left hand remaining extended. The thumb of the clasping hand is *not* used; encircling the left hand twists the right and impairs the direction of pull. The movements are repeated, using alternate hands, one to clasp and one to extend; both being thrust down and pulled apart; also holding the back vertical, namely, not protruding the belly. It is sufficient to make ten extensions at a time—five with each hand—and daily at least for two or three months; then two or three times a week.

144. Abstracted in THE JOURNAL, Oct. 10, 1914, p. 1321.

146. **Hemiplegia and Aneurysm.**—Sixty days before Boston and Rummage saw this case, a man, 41 years of age, the patient while working was seized by an attack of severe pain immediately beneath the sternum, which preceded syncope. The pain subsided in approximately one-half hour, but following the disappearance of the pain, the patient noticed that he was unable to speak in his usual tone of voice. From the date of this attack his power of speech gradually lessened until aphonia supervened. Following the attack of syncope, previously cited, the patient experienced vague pains in the right arm and right leg. Hand in hand with the foregoing annoyances, there developed a harsh,

rasping paroxysmal cough, accompanied by profuse serous expectoration. Dyspnea was a conspicuous feature following the attack of syncope and progressed from bad to worse.

Three days before admission to the hospital, the patient, while sitting, was seized with an attack of vertigo and fell to the floor; consciousness was not lost. Until his admission and throughout his stay in the hospital, the patient displayed total inability to move the right arm, right leg, or right side of the face, features shown post mortem to be caused by cerebral embolism. The right half of the chest appeared to expand somewhat more than did the left during inspiration. The neck became markedly distended during paroxysmal attacks of coughing, and at such times there was an appreciable increase in the size of the veins of both the neck and upper portion of the thorax. There was incontinence of both urine and feces. Tracheal tugging was obtained.

The patient displayed arterial atheroma. The systolic blood-pressure remained around 160 mm. of mercury; diastolic 100 mm. Corresponding to the upper segment of the sternum was an area where the percussion note was appreciably impaired, and this area was imperfectly circular in outline, with a diameter of approximately 2 inches; at no time was there any undue evidence of pulsation or thrill over this dull area. A bruit was not audible over the side of the aneurysm.

Necropsy report: At the beginning of the transverse arch of the aorta was found an aneurysm about the size of an orange. This aneurysmal sac involved both the beginning of the innominate artery and a portion of the aorta beyond that point where the (innominate artery) blood supply to the right arm is given off. The aneurysm was fully two-thirds filled with well organized clot. A portion of the clot occupied the anterior surface of the aneurysmal sac, a pathologic feature which doubtless explains why abnormal pulsation was not detected in the sternal notch, and also why a bruit was not audible over the aneurysm.

Old Dominion Journal of Medicine and Surgery, Richmond, Va.

November, XIX, No. 5, pp. 165-233

150 Diagnosis and Prognostic Values in Renal Conditions. L. B. Wiggs, Richmond.
151 Treatment of Psychoneurotic Patients. T. A. Williams, Washington, D. C.
152 Addison's Disease. D. Vanderhoof, Richmond.
153 Traumatic Rupture of Spleen, Operation with Recovery. B. C. Willis, Richmond.
154 Syphilitic Facial Paralysis. S. B. Cary, Richmond.

Philippine Journal of Science, Manila

August, IX, No. 4, pp. 307-380

155 Pipette Method in Isolation of Single Micro-Organisms and in Inoculation of Substances into Living Cells. M. A. Barber, Manila.
156 Diagnosis of Asiatic Cholera at Necropsy. B. C. Crowell, Manila.
157 Typhoid in Philippines. P. Gutierrez.

Texas State Journal of Medicine, Fort Worth

November, X, No. 7, pp. 255-302

158 Cesarean Section. S. M. D. Clark, New Orleans.
159 H. W. L. Crosthwait, Waco.
160 Cesarean Section in Treatment of Eclampsia. M. B. Stokes, Houston.
161 Case of Extra-Uterine Pregnancy. J. Gilbert, Austin.
162 Experiences and Results with Wassermann Test. L. J. Spivak, Victoria.
163 Luetin as an Aid in Diagnosis of Syphilis. J. H. Black, Dallas.
164 Multiple Sarcomatosis of Brain and Spinal Cord. H. Hartman, Galveston.
165 Some of the Newer Operations for Glaucoma. J. O. McReynolds, Dallas.
166 Etiology of Glaucoma. J. H. Burleson, San Antonio.
167 Case of Lateral Sinus Thrombosis. W. D. Jones, Dallas.
168 Ocular Palsies: Etiology and Treatment. L. H. Lanier, Texarkana.
169 Bronchoscopy with Tracheotomy. R. H. T. Mann, Texarkana.

Vermont Medical Monthly, Burlington

November, XX, No. 11, pp. 527-540

170 Fractures of Spine and Pelvis. F. J. Cotton, Boston.
171 Double Extra-Uterine Pregnancy with Rupture of One Tube. G. M. Sabin, Burlington.
172 Dangerous and Non-Dangerous Disturbances of Heart. O. C. Baker, Brandon.

Washington Medical Annals

November, XIII, No. 6, pp. 335-381

173 Sanitation in Ancient Civilizations. D. S. Lamb, Washington, D. C.
174 Goldberger Diet in Pellagra. Report of Case. W. M. Barton, Washington, D. C.
175 Foreign Body Removed from Urinary Bladder. L. Eliot, Washington, D. C.

West Virginia Medical Journal, Wheeling

December, IX, No. 6, pp. 181-216

176 Treatment of Fractures of Long Bones. J. W. McDonald, Fairmont.
177 Small-Pox—Diagnosis and Sanitary Control. S. L. Jepson, Wheeling.
178 Use of Pituitrin in Obstetrics. H. G. Tonkin, Martinsburg.
179 Principles of Criminal Anthropology. A. MacDonald, Washington, D. C.
180 *Report of Five Cases of Dementia Praecox Treated by Nuclein Solution (Lundvall's Formula). H. W. Keatley and R. M. Bobbitt, Huntington.
181 Sanitary Control of Water-Ways. S. C. Highland, Clarksburg.

180. **Dementia Praecox Treated by Nuclein Solution.**—The patients treated by Keatley and Bobbitt were given calomel and laxative salines and a leukocyte count made. They were then started on intramuscular injections of nuclein solution. The formula used was that modified by Lundvall. They began with a dose of 1 c.c. and gradually increased it during the first two and one-half months to 10 c.c. and then increased or diminished it according to the reaction of the patient. The solution was injected deep into the muscles, using aseptic precautions. The reaction obtained was not as severe as spoken of by other authors. Only one patient had a chill after receiving 11 c.c.

There was no febrile reaction on the administration of less than 3 c.c. The reaction obtained on doses over this amount were distinct but not severe, the temperature rising from 99 to 101 F., the pulse rate being moderately increased and a feeling of malaise occurred in some cases. The first marked hyperleukocytosis occurred after the injection of 5 c.c. of the solution. The hyperleukocytosis ranged from 11,000 to 15,000 a few hours after administration of the nuclein, the count in one case being as high as 17,500. The polymorphonuclear neutrophils were found to be relatively increased. There was never any local reaction. There was an absolute lack of mental improvement in four of these cases. One case showed some temporary improvement which lasted only a short while. The administration of nuclein was discontinued because of the persistent loss of weight, with failing health and lack of mental improvement.

Wisconsin Medical Journal, Milwaukee

November, XIII, No. 6, pp. 217-256

182 Diagnosis of Joint Diseases. A. R. Colvin, St. Paul, Minn.
183 Treatment and Indications for Operation in Glaucoma Simplex. H. S. Gradle, Chicago.
184 Medical Legislation. A. C. Umbreit, Milwaukee.
185 Existing Laws and Legislation Needed in Constructive Care of Poor and Mentally Irresponsible. K. L. Van Wyck, Milwaukee.
186 Clinical Tour Through Europe. E. Evans, La Crosse.

FOREIGN

Titles marked with an asterisk (*) are abstracted below. Single case reports and trials of new drugs are usually omitted.

Indian Medical Gazette, Calcutta

November, XLIX, No. 11, pp. 417-456

1 Asylum Dysentery. P. Heffernan.
2 Construction and Administration of Central Asylums in India. W. S. J. Shaw.
3 Two Cases of Hysteria in Males. P. Heffernan.
4 Two Cases of Anergic Stupor Treated with Thyroid Gland Extract. B. S. Bhiday.
5 Treatment of Earlier Stages of Senile Cataract. H. Smith.
6 Prevention and Treatment of Septic Wounds in Warfare. F. W. Sumner.

Journal of Tropical Medicine and Hygiene, London

November 16, XVII, No. 22, pp. 337-352

7 Dracontiasis or Dracunculosis. R. E. McConnell.

Lancet, London

December 5, II, No. 4762, pp. 1287-1342

8 *Modern Aspects of Certain Problems in Pathology of Mental Disorders. Treatment with Thyroid. E. Goodall.
9 *Case of Leprosy Treated Successfully with Radium and Diathermy. C. E. Iredell.
10 Cases of Anomalous Fever. S. Taylor.
11 *Glycerin in Bromidrosis. T. H. C. Benians.

8. **Thyroid Extract in Certain Mental Disorders.**—For many years Goodall has employed thyroid extract in cases of stupor and stupor with melancholia, or of confusional insanity—cases which have certain features in common with myxodematous cases, but until the last two years the failures were more numerous than the successes. He attributes many of those failures to the circumstance that he gave insufficient doses of thyroid. His recent experience entirely justifies those who have insisted on large doses if any benefit is to follow. Thyroid is not only beneficial in acute stupor, or acute dementia, and "confusional" states, but also at a later stage of these conditions and of cases of recent melancholia, when the patient has improved to a certain point and there remained. In these cases administration of thyroid has appeared to complete the process of recovery.

Eleven patients suffering from such mental disorders were treated by this method. These patients were kept in bed during the whole course of treatment, usually in the open air, on liberal diet; and the temperature, pulse, and respiration were taken throughout twice daily. All had been mentally ill for months before the thyroid treatment was started. The amount of thyroid given varied from 25 to 50 grains a day for five to eight weeks. The pulse-rate was affected in the direction of increase very consistently, whereas the temperature and respiration were affected but slightly, or not at all. Gain of weight during the treatment occurred in two of eleven cases; one showed no change; in all the others a loss was noted, but after cessation of treatment weight was rapidly regained, and in eight instances there was ultimately a gain on the original weight. The results were highly satisfactory, since no less than six patients of eleven became well; and all the others, except one, showed a definite improvement, and this one had been deranged for no less than three years when treatment was employed.

In eleven out of twelve cases of epileptic insanity treated with thyroid the number of fits was reduced. The patients were not on any other drug, but were kept in bed on ordinary diet with, in some cases, extras, such as milk and egg. A reduction of weight occurred in all except one. The observation as to the pulse, respiration, and temperature made in connection with the first series of cases apply also to this series. On the basis of these results Goodall kept certain of these patients on 5 grains of thyroid daily for a prolonged period; the patients were up as usual and on their usual diet. A substantial reduction in the number of fits occurred in many of these cases, amounting in some to from 52 per cent. to 65 per cent., as a result of a small daily dose of thyroid. No ill-effects were observed.

9. **Case of Leprosy Treated with Radium and Diathermy.**—Three facts are specially worthy of note in Iredell's case of maculo-anesthetic leprosy: (1) that the patient is better in all respects than he was six months ago; (2) that his improvement began when diathermy was started, and (3) that he felt better directly after each treatment. The disease in his case has been characterized by (a) macula, (b) two lepromes, (c) neuritic affections, and (d) intestinal trouble. (a) These were the symptoms of the first stage of the disease and passed off before treatment was begun. (b) A leprome on the cheek disappeared spontaneously; that on the lip was not treated with diathermy, and therefore it cannot be said what the effect of diathermy would have been, but it certainly seemed to respond at once to radium treatment. (c) The effect of diathermy on the patient's ulnar nerve was remarkable. For some time he had been in the habit of putting his arm in a hot bath in order to ease the pain. After holding two electrodes in his hands for twenty minutes the pain in the arm was far more relieved than it had been by the hot baths, and he found that he was able to move the little finger better than he did before. Some twinges of the left external peroneal nerve cleared with one application. (d) No less striking than the effect of the treatment on the nerves was the effect on the abdominal trouble. While the treatment was in progress peristalsis was distinctly perceptible to the patient, and in the course of the twenty-four hours following, very copious evacuation occurred, although no drug was used. This in marked contrast to what had happened in the first three attacks, when it was found necessary to use aperients. Since April, when the treatment started, he has had five treatments at intervals of a few weeks, and on two occasions he had treatment daily with corresponding benefit.

11. **Glycerin in Bromidrosis.**—Of five cases treated by Benians three were of a mild type associated with the warm weather. These were completely relieved while the treatment lasted, but relapsed when it was discontinued. The other two cases were of a severe type. The condition had persisted for some months in spite of energetic measures taken to insure cleanliness, and despite the continued application of drying and disinfectant powders. In both of these two latter cases there were blisters and abrasions, and in both cases the condition was completely cured in the course of three days by the application of glycerin well spread over the soles and toes before the socks were put on, this being repeated each morning as long as was necessary (three times in both cases).

Practitioner, London

December, XCIII, No. 6, pp. 733-872

12 Injection Treatment for Hemorrhoids. J. F. Goodhart.
13 Ointments—Their Therapeutic Value and Their Abuse. J. Galloway.
14 Symptoms and Diagnosis of Stone in Urinary Tract. P. J. Freyer.
15 Venereal Diseases as We See Them To-Day. J. E. R. McDonagh.
16 Diagnosis of Obscure Cases of Carcinoma. W. E. Wynter.
17 *Legally Established Case of Traumatic Carcinoma of Breast. W. S. Handley.
18 Pneumothorax Treatment of Phthisis. C. Riviere.
19 War Diseases; Typhus Fever, Enteric Fever, Dysentery and Cholera. G. S. Bigg.
20 Phenol in Treatment of Tetanus. Report of Case. A. A. Pim.
21 Urticaria Papulosa. H. W. Barber.
22 Lung Affections in Influenza. D. T. Richards.
23 Longevity of Eminent Medical Men. H. Drinkwater.

17. **Case of Traumatic Carcinoma of Breast.**—The following case is of interest, for it is the first in which the doctrine of traumatic carcinoma has been accepted in the English high courts. A woman consulted Handley on March 26, 1912. She stated that on Nov. 3, 1911, she fell over a beam, where building operations were in progress, landing on the left elbow and the left breast. The arm had to be kept in a sling for three weeks, and subsequently its movements were stiff. About Jan. 1, 1912, she first noticed a discharge from the left nipple, and shortly afterward a small lump was noticed in the left breast. Ever since the accident her general health has been impaired. On examination Handley found the upper half of the left breast occupied by a large and advanced malignant tumor, extensively adherent to the overlying skin. The tumor appeared to be a rapidly-growing one. It was removed by him April, 1912. Examination of the growth showed it to be a rapidly growing duct-carcinoma, evidently of multifocal origin, for it mapped out accurately the anatomic limits of the group of lobes forming the upper hemisphere of the breast.

Bulletin de l'Académie de Médecine, Paris

November 17, LXXII, No. 36, pp. 259-268

24 *Relations between Meteorologic Conditions and Air-Borne Epidemic Disease. A. Trillat.
25 *Morphin for Painless Delivery. (Sur l'emploi de la morphine comme analgésique.) G. Bertrand.
26 *Medicated Gauze for Dressing Wounds in War. (La gaze au trioxyméthylène.) Pauchet and Sourdat.

24. **The Weather and Air-Borne Infectious Disease.**—Trillat has been studying epidemics in connection with meteorologic conditions and has found that the faculty possessed by micro-organisms of serving as a nucleus for

V. 191

condensation of moisture is an important factor in the spread of infection. When numbers of micro-organisms thus serve as surfaces for condensation of moisture, they form a moist dust which obeys physical laws quite different from those which govern dry dust. The size of these microbian droplets and the time required for them to settle down in quiet air are dependent on the size of the germs, and gravity aids in sifting out certain ones from the crowd of droplets. When smaller than a micron in diameter they escape the action of gravity and obey only the laws of thermodynamics, being swept along and separated by air currents and attracted instantaneously to a cold region or surface. The attraction of the cold area or surface is felt and yielded to even against a current of air.

Microbes thus suspended in droplets in the air are extremely sensitive to favoring or antiseptic influences. The gases of respiration or of vegetable or animal decomposition transform each of the droplets into actual microscopic culture media. In certain circumstances a volume of humid and sterile air can be inoculated throughout by the introduction of such microbian droplets. The connection between epidemics and meteorologic conditions, wind, heat, low atmospheric pressure, electric conditions, etc., is thus evident. The microbian droplets can be carried for considerable distances by the wind and then, under the influence of sudden cold, be instantaneously localized in a region, without losing their biologic properties. The fact that this can occur also against the prevailing wind explains the capricious course of certain extensive epidemics of disease transmissible by the air. Other causes may cooperate in the assembling and sifting out of the microbes, especially whirling eddies of air. The action of electricity is complex. In the formation of ozone it exerts an antiseptic action, while, on the other hand, the ionization of the air promotes the condensation of moisture and the formation of droplets. Low barometric pressure permits the escape of gases stored in the soil and elsewhere and these facilitate condensation and multiplication of pathogenic germs. He suggests that this may be one factor in making a soil a tetanus-breeder.

25. **Morphin for Painless Delivery.**—For editorial comment see THE JOURNAL, Dec. 19, 1914, p. 2233.

26. **Trioxymethylene Gauze for Wounds in War.**—Pauchet and Sourdat have found that the best of all dressings for the wounded soldiers is gauze impregnated with paraformaldehyd. It is not only aseptic but it sterilizes and fastens the tissues with which it comes in contact, and the wound seems to dry up without oozing or suppuration. There is no need for asepsis in preparing the gauze. It is placed in a tin box or other covered vessel and a few tablets of trioxymethylene (paraformaldehyd) are placed in the bottom of the box and it is then set near a stove or radiator (about 50 C.) for an hour. In case of a seton wound, they cut the bridge of tissue and pack the groove with this medicated gauze with a dry dressing over it. Wicks of the medicated gauze are introduced into the depths of the tissues in case of a compound fracture, leaving the splinters of bone and the tissues unmolested as much as possible. The effect is a kind of embalming and with the limb thus treated, and splinted the wounded man can stand a long journey. Even after amputation for gas gangrene, treating the stump with this medicated gauze facilitates rapid healing. It should never be applied after tincture of iodin as it is liable to prove irritating, but under other conditions, they have found it incomparably better than any other method at their command for dressing wounds in war. The dressing does not have to be renewed generally until the fifth day.

Archiv für Gynaekologie, Berlin

CIII, No. 2, pp. 243-394. Last indexed Aug. 29, p. 811

27 *Necrosis of Cortex of Both Kidneys in Eclampsia. (Fall von doppelseitiger, totaler Nierenrindennekrose bei Eklampsie, nebst kurzem Abriss über den derzeitigen Stand der Eklampsiefrage.) A. Schüppel.

28 *Leukemia in a Pregnant Woman. (Leukämie in der Schwangerschaft.) A. Petersen.

29 Spontaneous Separation of Left Fallopian Tube. (Spontantrennung der Tube und Verlagerung der Adnexe.) M. Ogorek.

30 *Anesthesia in Gynecology. III and IV. (Stickoxydulnarkosen; Lumbalanästhesie.) H. Schlimpert.

31 *Physiologic Occurrence of Arsenic in Human Organs, Especially in Women. V. Frommer.

32 *Puerperal Tetanus. R. Spiegel.

27. **Eclampsia.**—Schüppel describes a case of total necrosis of the cortex of both kidneys found at necropsy of a woman of 35 who had succumbed to puerperal eclampsia. The findings indicated that eclampsia may be the result of excessive destruction of the formed elements of the blood from injury of the liver or kidney during the pregnancy, thus checking the normal elimination of the waste products of the placenta. The wreckage of the formed elements thus destroyed in excessive amounts blocks the finer vessels, and the shape and size of the vessels in the kidney cortex render this a particularly serious matter here, the circulation through the whole cortex thus being soon shut off completely. Any therapeutic measure, even decapsulation of the kidney, would be entirely useless in such a case.

28. **Leukemia in a Pregnant Woman.**—Petersen recalls that Hermann in 1901, commenting on eight cases he had compiled, remarked that the enlargement of the spleen and liver in leukemia causes greater disturbance of course when the uterus is distended, so that the symptoms from leukemia are more severe in the pregnant. Abortion is also more common, but if the patient survives the abortion or miscarriage the condition materially improves thereafter. French in 1908 reiterated that the prognosis in leukemia is far graver in the pregnant than in the non-pregnant. He knew of seven cases on record, and Petersen states that no instance was known among the 22,000 obstetric cases at the Breslau Provincial Maternity until recently a woman of 24, nearly at term, was sent there in a serious collapsed condition with the presumptive diagnosis of leukemia. The spleen was not much enlarged and the blood did not show the characteristics of either leukemia or pernicious anemia. But necropsy revealed the changes in the organs typical of myeloid leukemia, and apparently confirmed the assumption that the leukemia had developed at the fifth or sixth month of the pregnancy. This was the case likewise in Greene and in Hilbert's cases, and the fatal collapse following spontaneous delivery was duplicated in these cases and also in one reported by Laubenburg in 1891. Petersen advises immediate interruption of the pregnancy as the only possible treatment when a woman known to be leukemic becomes pregnant, as also when leukemia develops in a pregnant woman. The earlier it is done the better. The child seemed healthy, showing no signs of leukemia at the time or since. Saenger and Cameron have also reported similar experiences showing that the child of a leukemic mother is not necessarily itself leukemic.

30. **Anesthesia in Gynecology.**—In this third part of his article Schlimpert describes his study of general anesthesia from nitrous oxid, comparing the various technics in vogue alone or combined with other anesthetics. Until recently it has had very little vogue in countries other than the English-speaking, but lately has been taken up with new interest in other lands. His extensive experience with lumbar anesthesia has convinced him that even with the most painstaking technic we must reckon with a certain proportion of refractory cases and a certain number of cases with persisting after-headache.

31. **Arsenic in Human Organs.**—Frommer has been investigating to learn what becomes of the arsenic entering the body in the food and normally eliminated in the urine and menstrual discharge. During pregnancy this elimination is impeded, and his theoretic assumption that arsenic is thus retained during pregnancy was confirmed by his research on rabbits, human fetuses and the organs from pregnant cadavers, including two cases of eclampsia, and in some male cadavers. The organs of one young man who had succumbed to Banti's disease showed quite a large proportion of arsenic. It was positively known that he had taken no arsenic during eight months at least before his death. In all the organs examined arsenic was found in amounts

ranging from traces to considerable proportions (*starker Arsenspiegel*). The effect of so much arsenic on the physiologic processes must not be disregarded any more than its importance from the medicolegal standpoint.

32. **Puerperal Tetanus.**—Spiegel adds four cases from his own practice to the sixty-two he has found in the literature in which tetanus developed soon after an abortion or birth of a child. In only one of his cases was the correct diagnosis made at once. He tabulates the details of the entire list and comments that early diagnosis and intravenous and intraspinal injection of antitetanus serum are the main reliance, clearing out the focus by rinsing and curetting the uterus. For this 70 per cent. alcohol seems to give the best results, as the tetanus toxin is precipitated by alcohol, and the spores deprived of their toxin are less dangerous. He advises tamponing the uterus with antitetanus serum, renewing the tampons each day; if the cervix is not dilated, daily rinsing with alcohol may suffice. Of all symptomatic measures to arrest the spasms, intraspinal injections of 5 or 10 c.c. of a 15 per cent. solution of magnesium sulphate seem to be most effectual. The patient's strength must be kept up with nourishing food. The conditions in the puerperal uterus favor absorption so that the incubation phase is comparatively short.

Beiträge zur Klinik der Tuberkulose, Würzburg

July 30, XXXII, No. 1, pp. 1-146. Last indexed Nov. 28, p. 1987

33 *Sensitization Index with the Tuberculin Skin Reaction. (Die Pirquetsche Kutanreaktion und die Bedeutung der Sensibilisierung bei derselben.) W. Frehn.
34 Diagnosis of Tuberculous Bronchial Glands in Children. E. Rach.
35 What Experimental Medicine Has Contributed to the Progress of Our Knowledge in Regard to Tuberculosis. F. Hamburger.
36 Skeletal Factors Contributing to Apical Disease. (Röntgenologische Studien über die Beziehungen zwischen Rippenknorpelverknöcherung und Lungentuberkulose.) F. Kaiser.
37 Ionized Air and Local Application of Electricity in Treatment of Tuberculosis. T. Brinck.
38 Rosenbach's Tuberculin in Treatment of Pulmonary Tuberculosis. M. Büschel.
39 Febrile Reaction and Hemoptysis after Diagnostic Injection of Tuberculin. (Fall von Tuberkulinschädigung bei der diagnostischen Anwendung des Tuberkulins.) Brösamlen.

33. **Improved and Uniform Technic for the Skin Tuberculin Reaction.**—Frehn emphasizes that the skin responds differently to the tuberculin test in different regions, and that it is important to choose the point responding most sensitively to the test and keep to this one point. Otherwise the reactions cannot be compared. The conditions in regard to the skin itself and the local blood and lymph circulation seem to be most favorable in the chest. He thinks that far more instructive findings than those hitherto obtained can be realized by testing to what extent the organism can be sensitized by the Pirquet skin test applied with 50 per cent. tuberculin. The test is then repeated with 5 per cent. tuberculin and again, exactly eight days later, the test is made again with the 5 per cent. tuberculin. He applies the test on both sides of the sternum each time and takes the average between the size of the two papules in square mm. As a rule, the second and third local reactions are much more pronounced when the resisting powers of the organism are at par or above. The reaction grows less and less pronounced the more seriously the organism is diseased. This double inoculation method, based on the sensitization which occurs in the vigorous from the first inoculation, seems to promise much greater accuracy and more instructive findings than with the ordinary technic. Frehn tabulates the findings in 33 clinically healthy, 94 per cent. demonstrating marked sensitization; in 36 patients in the first stage of tuberculosis, with evidence of sensitization in 71 per cent.; in 30 in the second stage, 43 per cent., and in 39 in the third stage with only 28 per cent. sensitized. The index is the quotient of the size of the papules from inoculation with the 5 per cent. tuberculin. All the clinically healthy persons tested had been in more or less contact with tuberculosis, and only 3 of the 34 gave a completely negative response to all the inoculations.

The first papule of one patient of 29 measured 73 square mm. with the 50 per cent. tuberculin; the second papule, with the 5 per cent. tuberculin, measured 8 mm. and the third 400. The index in this case was therefore $400 \div 8 = 50$. The highest index in this group was in a patient of 24 whose papules measured, respectively, 32, 0 and 157. His index was thus $157 \div 0 = 157$. The lowest was in a man of 28 with psoriasis and the build suggesting a predisposition to tuberculosis. His figures were 81, 28 and 68, with index of 2.4.

In the cases of actual tuberculosis (first stage), the figures ranged from the series, 8, 7 and 12 (with index of 1.7), to 233, 231 and 262, with index of 1.1. In none in this group was the index over 4.1, and in all but 3 it was below 2. In 9 it was below 1. In the 30 in the second stage and the 39 in the third stage, the index was below 2 in all but one case and below 1 in over 50 per cent. Typical figures for the papules in these groups were 263, 62 and 53; index 0.9, and 178, 101 and 45; index 0.5.

The index in the four groups averaged 20.1; 1.6; 1.4, and 1.2. One important practical conclusion from Frehn's work is that the prospect for tuberculin treatment is most promising when sensitization seems to be most pronounced.

Berliner klinische Wochenschrift

November 16, LI, No. 46, pp. 1805-1828

40 Indirect Shell Wounds. (Zur Kasuistik der Verletzungen durch indirekte Projektile.) E. Melchior.
41 Impeded Breathing through the Nose Does not Seem to Predispose Guinea-Pigs to Tuberculosis. (Experimentelle Versuche über den Einfluss behinderter Nasenatmung auf das Zustandekommen der Inhalationstuberkulose.) G. Finder and L. Rabinowitsch.
42 *The Limitations of Organotherapy. (Die Grenzen der Organtherapie.) A. Münzer.
43 Prophylaxis and Treatment of Venereal Diseases in the Active Army. (Geschlechtskrankheiten im Felde.) P. Scharff.
44 Treatment of Diarrhea by Sedative Medication. (Behandlung der Durchfälle im Felde.) E. Fuld.

42. **Limitations of Organotherapy.**—Münzer emphasizes that no organ works independently. Each acts on others and is acted on by others so that it is futile to hope that administering the extract of one organ will take the place of the organ in the general phenomena going on. A dead preparation can never take the place of a living organ. The only real organotherapy, he insists, is the transplantation of a sound organ in the place of the diseased one. Everything else in the way of organotherapy is but a makeshift.

Deutsches Archiv für klinische Medizin, Leipzig

CXVI, Nos. 3-4, pp. 201-436. Last indexed Sept. 12, p. 977

45 Effect of Sodium Bicarbonate on the Excretion of Chlorids and of Milk Sugar Injected Intravenously. J. Goldberg and R. Hertz.
46 Experiments in Salt and Water Metabolism in the Healthy. L. Borelli and P. Girardi.
47 *Primary Pulse Wave in the Human Arm. A. W. Hewlett (Ann Arbor).
48 Effect of Anaphylaxis on Nitrogen Metabolism in Rabbits. R. H. Major (San Francisco).
49 Disturbances in the Automatism of the Heart. E. Weiser.
50 Effect of Bruce's Micrococcus Melitensis and Its Toxins on the Peripheral and Central Nervous System. R. de Nunno.
51 *Palpability of the Arteries. L. Landé.
52 Genesis of Albumin Catabolism in Fever. E. Grafe.
53 *The Coronary Circulation. P. Morawitz and A. Zahn.
54 Dynamics of the Mammalian Heart. II. H. Straub.

47. **Pulse-Flow in Human Arm.**—See abstract 24, page 2071, in THE JOURNAL, Dec. 5, 1914.

51. See editorial, Palpation of Arteries, in THE JOURNAL, Nov. 28, 1914, p. 1956.

53. **Research on the Coronary Circulation.**—Morawitz and Zahn describe in detail their studies of the coronary circulation in living animals and give tabulated results. The quality of the circulation in the heart muscle seems to be dependent on the arterial pressure. Any increase of arterial pressure by abdominal compression, infusion of blood or salt solution and epinephrin increases the flow of blood from the coronary vessels. Epinephrin also has a direct dilating effect on the coronary vessels. It is by far the most effective means of increasing the circulation through the heart muscle. In spite of that it does not seem to be effective in human angina pectoris. Quickened heart action produces unfavorable conditions for the circulation in the heart muscle. Stimulation of the accelerans cordis dilates the coronary vessels; stimulation of the vagus decreases the dis-

charge of blood from them. Pituitary extract and nicotin contract the coronary vessels. This vasoconstriction can sometimes be demonstrated in spite of the increased blood-pressure.

Deutsche medizinische Wochenschrift, Berlin

November 12, XL, No. 46, pp. 1953-1976

55 Treatment of Tetanus. (Behandlung schwerer Tetanusfälle.) T. Kocher and E. v. Behring.
56 Roentgen and Heliotherapy of Wounds in War. (Röntgen- und Lichtbehandlung zur Heilung von Schussverletzungen.) Kromayer.
57 First Battle-Field Impressions. (Erste kriegschirurgische Eindrücke.) Stachow and Wiewiorowski.
58 Traumatic Anosmia and Enophthalmos. J. Strebel.
59 Measurement of Urine Excreted by Infants. (Die Harnabschiedung des Säuglings.) Engel.
60 Improved Technic for the Blood-Count. (Blutkörperchenzählung.) W. Roerdansz.

Deutsche Zeitschrift für Chirurgie, Leipzig

September, CXXXI, Nos. 3-4, pp. 189-396

61 Experimental Removal of One Entire Lung. (Lungenexstirpation.) K. Kawamura.
62 Obturator Hernia. A. Wagner.
63 *Juvenile Deforming Osteochondritis of the Hip Joint. M. Brandes.
64 *Acute Necrosis of the Pancreas. Jenckel.
65 Surgical Experiences in the Servia-Turk War 1912-1913. E. Stierlin and A. L. Vischer.
66 Bacteriologic Importance of the Secretions of the Cutaneous Glands for Aseptic Operations. (Bakteriologische Bedeutung der Hautdrüsensekrete bei der aseptischen Chirurgie.) Y. Ozaki.
67 *Bone Cysts. (Pathogenese der sogen. Knochencyste.) J. Bolognesi.

63. **Juvenile Deforming Osteochondritis.**—Brandes reports ten cases with the Roentgen findings and remarks that the cases of supposed tuberculous hip-joint disease with recovery may have been merely cases of this comparatively benign affection, juvenile deforming osteochondritis. (See THE JOURNAL, May 2, 1914, p. 1444, abstract 174). Ankylosis does not seem to occur in this affection. He applied a walking plaster cast for two or three months, materially improving conditions so that afterward there was much less limp.

64. **Acute Necrosis of the Pancreas.**—Jenckel reviews his experience with acute necrosis of the pancreas in nine cases, all men but three. The youngest was 28, the oldest 75. With one exception all were well nourished and inclined to corpulency. There was gall-stone trouble only in three of the cases. In three other cases the necrosis developed after a laparotomy. With severe clinical symptoms an operation is indicated without delay, but temporizing is justified if the symptoms are mild and the bowels move after one or two enemas, and the pulse keeps good and not much accelerated —when these conditions are encountered dietetic measures alone may bring relief. The cases reported demonstrate anew that slight attacks of a similar character had occurred before and passed harmlessly over. Even a very severe form may spontaneously retrogress, as in one of his cases, but this is so rare it should not be counted on. Operative treatment can cure only when the toxic action has not been too severe and the further progress of the necrosis can be checked.

67. **Pathogenesis of Bone Cysts.**—Bolognesi reports entirely negative results from his experimental research on the origin of bone cysts. Neither with trauma nor with an infectious process was he able to induce the formation of a bone cyst.

Jahrbuch für Kinderheilkunde, Berlin

November, LXXX, No. 5, pp. 467-560

68 Severe Anemia in Childhood. E. Stettner.
69 *The Pathologic-Anatomic Changes in the Myocardium and Heart Ganglia in Scarlet Fever. A. Stegemann.
70 Two Peculiar Diseases of Breast-Fed Infants in Japan: Infantile Beriberi; Spasmophilic Dyspepsia. (Säuglingskakke.) (Spasmophile Dyspepsie bei natürlicher Ernährung.) K. Takasu.
71 Inflammation of the Accessory Cavities of the Nose as Complications of Scarlet Fever. (Nebenhöhlenentzündungen der Nase bei Scharlach.) M. Paunz.

69. **Changes in the Myocardium and Heart Ganglia in Scarlet Fever.**—From an examination of forty-nine cases Stegemann comes to the following conclusions: In severe toxic cases of scarlet fever of short duration, the parenchymatous changes in the heart muscle are slight. In the infectious form of long duration, in addition to acute parenchymatous degeneration, there are fatty degenerations and necrosis. Interstitial round-cell infiltration of the heart wall is lacking in the short severe toxic cases, but is always present in the long infectious cases. In the stroma of the heart ganglia, round-cell infiltration can be demonstrated in the first days of the disease; its intensity is dependent on the severity and duration of the disease. Fatty degeneration and necrosis of nerve cells were observed on the first day of the disease. The number and size of the Nissl bodies were markedly decreased in the severe toxic cases, in contrast with the infectious cases. These facts seems to show that in the severe toxic cases of scarlet fever, of short duration, the cause of the heart weakness lies in pathologic changes in the heart ganglia. The nervous theory of the origin of the heart disturbance in scarlet fever has gained ground recently at the expense of the myocardial theory.

Medizinische Klinik, Berlin

November 15, X, No. 46, pp. 1679-1702

72 Not Every Dysentery is Contagious. (Wandlungen des Ruhrbegriffs.) H. Quincke.
73 Small-Pox and Its Prophylaxis. (Blattern und Blatternbekämpfung) G. Patil.
74 Treatment of Wounds on the Battle Field. (Wundbehandlung im Felde.) A. Köhler.
75 Treatment of Tetanus. Spanuth.
76 Atrophy and Rigidity of Chest Muscle in the Tuberculous. (Muskelatrophie und Muskelstarre am Brustkorb des Phthisikers.) K. Hart.
77 Continuous Slumber for Three and a Half Years after Injury of the Brain; Recovery. (Kontinuierlicher, viereinhalb Jahr andauernder Schlafzustand im Anschluss an Kopftrauma, mit Ausgang in allmähliche Wiedergenesung.) A. Eulenburg. Commenced in No. 45.

Monatsschrift für Geburtshülfe und Gynäkologie, Berlin

September, XL, No. 3, pp. 332-442

78 The Hymen. (Zur Frage des menschlichen Hymen.) H. Klaatsch.
79 Pathogenesis of Eclampsia. O. Vertes.
80 Gas Phlegmon after Criminal Abortion. M. Dirks, Marmetschke and Kriebel.
81 Histogenesis of Myoma of the Uterus. K. Ulesko-Stroganowa.
82 *Differential Diagnosis of Chronic Appendicitis. C. W. Bischoff.

82. **Differential Diagnosis of Chronic Appendicitis.**—In 1911 Bastedo proposed a method of differential diagnosis of appendicitis: A rectal tube is introduced into the previously emptied intestine, and the colon filled with air. If the appendix is diseased, the patient feels a sharp pain in the region of the appendix, sometimes radiating to the umbilicus. If the appendix is normal, there is no pain, but only a feeling of distention, or sometimes an unpleasant sensation between the umbilicus and the symphysis. Of course, overdistention should be avoided; the sign is elicited by moderate distention. To test the value of this sign, Bischoff tried it in a series of thirty-seven laparotomies. In twenty-three of them Bastedo's sign was present; in all these cases there was chronic appendicitis of the most varied forms, adhesions to the neighboring tissues, contraction of the mesenteriolum, kinking, stenosis, fecal calculi or oxyuris. In fourteen cases Bastedo's sign was not present, and in these cases the appendix was found normal. Particularly interesting were six cases in which the right adnexa were diseased, and in which Bastedo's sign furnished a differential diagnosis from appendicitis. Another interesting case was one of cholelithiasis. All the symptoms were those of appendicitis, pain at McBurney's point, stomach symptoms, pain in the region of the umbilicus, etc., and there were no decided symptoms of cholelithiasis. Bastedo's sign was negative, and the appendix was found absolutely normal.

Distention of the colon is also valuable in differentiating between appendicitis and neuralgias. The latter are frequently found in gonorrheal patients and often cause pain at McBurney's point. Pain at McBurney's point should not be so much emphasized as a sign of appendicitis, for it is often found in other conditions. Rost asserts that Bastedo's sign is positive not only with disease of the appendix, but also in pathologic conditions in the colon. Bischoff has no

data on this subject. Rost says, too, that the pain appears only if there are changes in the mesenteriolum which bring the appendix into a certain abnormal relation to the cecum, but Bischoff found it positive when the mesenteriolum was entirely normal and the appendix alone was diseased. In the cases that he examined after operation there was no longer the slightest pain in the appendix region when the colon was distended.

Monatsschrift für Kinderheilkunde, Berlin

XIII, No. 4, pp. 165-204

83 Dermographism in Childhood. A. Brinckmann.
84 Theory and Practice in Friedmann's Treatment of Tuberculosis. F. Lust.
85 Acidity in Infant's Stomach Content. H. Davidsohn.
86 Historical Discussion of "Recurring Umbilical Colic" in Children. O. Herbst.
87 Treatment of Stenosis of the Larynx in Childhood. G. Siewczynski.

Münchener medizinische Wochenschrift, Munich

November 17, LXI, No. 46, pp. 2233-2268

88 Treatment of Syphilis. (Abortivkur, Spirochätenreste und kombinierte Behandlung der Syphilis.) W. Lier. Concluded in No. 47.
89 *Roentgen Treatment of Hypertrichosis. D. Chilaiditi.
90 *Germs Congregate in Fetus and Spare the Mother. (Die Infektionen des Fötus.) F. Masay.
91 *Mechanical Devices to Aid in Overcoming Writer's Cramp. (Neue Apparate zur Schreibkrampfbehandlung.) O. B. Meyer.
92 *Tetanus. Hochhaus, Kreuter, E. Müller, Rothfuchs and K. Alexander.
93 Improved Technic for Artificial Legs. (Künstliche Beine.) v. Baeyer.
94 Brace for Extension in War Wounds of the Long Bones. (Die Hackenbruchschen Distraktionsklammern zur Behandlung von Knochenverletzungen im Felde.) A. Schnée.
95 War Wounds of the Nervous System. (Kriegsverletzungen des Nervensystems.) Hotz. Commenced in No. 45.

89. **Cosmetic Depilation.**—Chilaiditi applies the Roentgen rays to the just sprouting hair and thus kills it. The hairs are pulled with tweezers and, two or three days later, the papilla is exposed to the rays filtered through 3 mm. aluminum plus 5 mm. leather. He says that the papilla and the hair as it first sprouts are most susceptible to the rays during this period of intense growth. A single sitting answers the purpose. The dose must be about 15 Holzknecht units, enough to induce a just visible reaction of the first grade.

90. **Infection of the Fetus.**—Masay experimented with the *Streptobacterium fetidum* injecting gravid guinea-pigs with it. The placenta was no obstacle to its passage into the fetus, and it actually seemed as if the fetus served as a kind of "fixation abscess," the germs congregating in it and forsaking the maternal organism. Two hours after the injection of the germs they were evident in the fetal blood. Emptying the uterus thus clears out the hosts of germs that have congregated in the fetus. This suggests that abortion is a natural phenomenon of defense. It is possible that the germs in the maternal organism may go at once to the fetus apparently without infecting the mother.

91. **Mechanical Devices for Correction of Writer's Cramp.**—Meyer treats the spastic forms of writer's cramp by having a hollow cast made of the hand in the proper position for writing. It forms thus a kind of rigid half glove fitting over the fingers and holding them immovably in the proper position for writing, thus preventing any spastic contracture until the hand outgrows the tendency. He gives illustrations of the cast made in two cases and used with complete success.

92. **Tetanus.**—Six articles are devoted to this subject, relating experiences with tetanus among the wounded. Hochhaus has had 46 cases, Kreuter 31, Rothfuchs and Alexander 10 and 8. Müller has found long hot baths a remarkable relief for the patients, and Rothfuchs reports benefit from salvarsan in 4 cases. Some claim great benefit from magnesium sulphate; others have nothing good to report from it. Alexander states that his 8 patients given 10 gm. of chloral in a single dose each day have all recovered; 2 given only 5 gm. died. Müller comments on the extreme relief afforded by tracheotomy in some cases. One of his 2 tracheotomized patients is apparently recovering. The other succumbed to weakness of the heart after subsidence of the tetanus.

Therapeutische Monatshefte, Berlin

November, XXVIII, No. 11, pp. 674-716

96 *By-Effects of Vaccination. (Zur Frage der Impfschädigung.) F. Göppert.
97 Vaccination against Typhoid. (Die Schutzimpfung gegen Typhus abdominalis.) H. Braun.
98 *Treatment of Tetanus. G. L. Dreyfus.

96. **Injury from Vaccination.**—Göppert has made a point in the last few years of following up every case of alleged injury resulting from vaccination, and states that he has found cases which imperatively teach a lesson of caution in certain respects. This is especially important in case of chronic eczema; the slightest trace of chronic eczema should cause the child to be excluded from vaccination for another year, even if six months have elapsed since the eczema was apparently cured. This should be the rule also if there is any case of chronic eczema in the family. Even a year after the healing of the eczema may be too early to do the vaccination. In regard to secondary infection he remarks that as erysipelas is far more serious for infants under 6 months old than later, children should not be vaccinated until they are over 5 months old. The scab in the second or third week is liable to come off, leaving a point of lesser resistance and inviting erysipelas. Children also with acute or chronic digestive disturbances or unstable convalescence from acute, recurring or chronic intestinal catarrh should be scrupulously excluded from vaccination. Some children react to every slight cold with fever or diarrhea, and when such troubles develop after vaccination they require suitable treatment not to be allowed to drag along. Copious intake of water should be enforced in particular. He adds that profuse sweating softens the skin and predisposes to furunculosis, etc., so that this is another reason for preferring to vaccinate outside of the heated term.

He covers the vaccinated region with medicated gauze held in place with strips of plaster with spaces between, or a perforated plaster. If there is much pain and restlessness or the axillary glands are swollen, he dresses the region with aluminum acetate after smearing with petrolatum. For this he cuts a slit in the center of a square of several thicknesses of gauze, 30 sq. cm., and has the arm slipped through the slit. The gauze is then drawn up and fastened to cover the arm and axilla. The dressing should be changed every twelve hours. The mother who brings the child for vaccination should be asked whether the child has been sick recently or has ever suffered from diarrhea or eruptions, cough or convulsions, and whether any one else in the family is sick. When vaccinating on a large scale, it is better to have the entire trunk exposed for examination, and any suspicious findings call for detailed investigation later. He adds that the ninth or tenth day is better for the reexamination than the seventh day, as any complications are then at their height as a rule.

98. **Tetanus.**—Dreyfus has already encountered twenty-four cases of tetanus among the wounded in the Frankfurt hospitals, and remarks that 500 cases developed among the wounded after the battle of Mukden in the Russo-Japanese war. In the Prussian army during the last twenty years of peace there have been only ninety-six cases. He emphasizes the vital necessity for local treatment of the wound and for avoiding anything which will cause the formation of a scab.

Therapie der Gegenwart, Berlin

November, LV, No. 11, pp. 433-456

99 Acute Hemorrhagic Colitis without Dysentery Bacilli. (Ueber unspecifische akut hämorrhagische Koltiden.) H. Strauss.
100 Magnesium Sulphate in Tetanus. J. v. Roznowski.
101 *Harmless Forms of Diabetes in the Young. (Zuckerkrankheit bei jüngeren Menschen.) E. Frank.
102 Impressions in a Field Hospital. (Erlebnisse und chirurgische Erfahrungen aus einem deutschen Feldlazarett.) R. Mühsam.

101. **Harmless Diabetes in the Young.**—Frank refers to the form known as renal diabetes, that is, without abnormal proportions of sugar in the blood. The more often the blood is examined for sugar as a routine diagnostic measure, the

more numerous such cases are becoming. The glycosuria of pregnancy is probably of this type. The trouble is not the result of injury of the organs regulating the metabolism of carbohydrates, but merely some functional disturbance of the kidney epithelium, traceable to some slight injury, possibly an overfunctioning. There is scarcely any probability of this renal diabetes becoming transformed into severe diabetes with large losses of sugar and acidosis. Weiland, Boenniger and Salomon have each reported cases under observation for five or ten years in which the syndrome kept stationary or improved. Transformation into actual kidney disease has never been observed, according to the literature on the subject. Only the condition known as pregnancy kidney may be regarded as the rarely occurring second phase of renal diabetes. There is none of the complications of ordinary diabetes, such as neuritis, pruritus, furunculosis, cataract, retinitis or falling out of the teeth, as the proportion of sugar in the blood is not pathologically high. There is no need for dietetic restrictions, and the renal diabetes may be regarded as a harmless anomaly in examining for life insurance.

Wiener klinische Wochenschrift, Vienna

November 5, XXVII, No. 45, pp. 1443-1470

103 Vaccination against and Treatment of Typhoid. (Ueber Schutzimpfungen und eine Bakteriotherapie des Typhus abdominalis.) R. Kraus.
104 *Sexual Diseases and the War. (Geschlechtskrankheiten und der Krieg.) E. Finger.
105 Influence on Mouse Tumors of Roentgen Rays. (Beeinflussung von Mäusetumoren durch Röntgenstrahlen.) O. Frankl and C. P. Kimball (Chicago).
106 Notifiable Infectious Diseases at Vienna 1901-1910. (Anzeigepflichtige Infektionskrankheiten Wiens). S. Rosenfeld. Commenced in No. 43.

104. Venereal Disease and War.—In the course of his long study of this subject, Finger states that even on a peace footing there is a daily average of 1,748 men under treatment for venereal disease in the Austrian army. During war time the proportion usually increases as he shows by statistics from one army corps in the Franco-Prussian War (first Bavarian): in 1871 the proportion ran up from 10.2 per thousand in January to 77.7 per thousand in May. Extensive epidemics in various districts followed the disbanding of the troops at the close of that war.

Zeitschrift für Kinderheilkunde, Berlin

August, XI, Nos. 5-6, pp. 337-516

107 Malformations of the Heart. (Herzmissbildungen.) F. Heller and G. B. Gruber.
108 Testing Kidney Function in Infants and Older Children. (Nierenfunktionsprüfung.) A. Bosler.
109 Love and Hatred of Children for Parents. (Die nosologische und kriminologische Bedeutung des Elternkonfliktes der Jugendlichen.) E. Lazar.
110 *Rachitis and Internal Secretion. E. Rominger.
111 *Pathogenesis of Digestive Disturbances in Infancy. IX and X. H. Bahrdt, F. Edelstein and E. F. Welde.
112 Meningitis as a Complication of Diphtheria. F. Reiche.
113 Bromoderma Tuberosum in a Nine-Months-Old Infant Following the Administration of Calcium Bromid. A. Dollinger.
114 Case of So-Called Hemispasm of the Lower Lip. E. B. Grünwald.
115 Diastatic Action of Urine of Children. W. B. McClure and P. S. Chancellor (Chicago).
116 Plethysmographic Examinations of Normal and Sick Children. R. Hess, S. Gordin and A. Simons.
117 Discussion of J. Husler's Work on Symmetrical Progressive Fat Atrophy in Children. A. Simons.

110. Rickets and Internal Secretion.—Rominger examined forty-one children and six normal adults by Abderhalden's method to determine whether any disturbance of the glands of internal secretion could be demonstrated in rickets. Twenty-eight of these individuals were rachitic and nineteen clinically free from rickets. He could not get uniform results in either the rachitic or non-rachitic cases, and concludes that the protective ferment reaction is not specific. No disturbance of function could be demonstrated by the Abderhalden method in the thyroid, thymus, ovary or testicle. Deutsch has claimed that there was almost always a regular digestion of thymus tissue by normal sera, but Rominger could not confirm this. He does not believe that Abderhalden's dialysis method can be utilized for the examination of the function of organs. It remains to be seen whether Griesbach's proposed quantitative determination of the albumin in the dialysate can be utilized for this purpose.

111. Pathogenesis of Digestive Disturbances in Infancy.—In overfeeding and decomposition of foods volatile fatty acids are formed that may be regarded as hypothetical toxins. Bahrdt and Edelstein have previously published papers in which they discussed the methods of determining these acids, and their effect on the intestine and on metabolism in animal experiments; also determination of them in the stomach contents and stools of infants. This paper takes up the examination of various foods with reference to their content in such acids—fresh milk, buttermilk and "spoiled" milk, containing various kinds of bacteria. They fed dogs with milk containing pure cultures of many different kinds of bacteria. After two hours the dogs were killed and the stomach and intestines examined for bacteria and for fatty acid content. They come to the conclusion that milk, even when infected with pure cultures of bacteria, does not form, within the first few days, sufficient quantities of volatile fatty acids to produce acute digestive disturbances. These facts indicate that spoiled milk does not play the preponderant part in the ordinary acute summer diarrheas of infants. The question they are trying to decide is whether these disturbances are caused by substances in the food or by changes in the chyme in the infant's body. Having determined that they are not caused simply by bacterial infection of milk, they intend to take up further experiments to find whether infected milk will produce worse effects if given in conjunction with conditions that interfere with the motor and secretory functioning of the stomach, such as heat and overfeeding. The details of their experiments are given in tabulated form, and there is an extensive bibliography.

Zentralblatt für Chirurgie, Leipzig

November 7, XLI, No. 45, pp. 1657-1672

118 Pincers to Turn Appendix Stump Inside. (Pinzette mit Innenschieber zur Einstülpung des Wurmforsatzstumpfes. G. Kelling.

November 14, No. 46, pp. 1673-1688

119 *Forward Dislocation of the Clavicle. (Zur Behandlung der Schlüsselbeinverrenkung nach vorn.) E. Braatz.
120 *Phenol-Camphor in Treatment of Infectious Processes. (Kurze Bemerkung zu der Originalmitteilung von Schiele.) G. E. Konjetzny.

119. Forward Dislocation of the Clavicle.—Braatz found that the dislocation recurred after reduction when the shoulder was drawn backward in the case reported. To prevent this, he bandaged the shoulder, pushing it forward and holding it in this pushed-over position with a hard pad of cotton at the back of the joint, held in place with strips of adhesive plaster and other bandages to keep the shoulder thus pushed forward. The clavicle and shoulder were kept immobilized in this way for two months and conditions have persisted normal since. This answers the purpose as well as Danielsen's method (described recently in these columns, Nov. 21, 1914, p. 1827), while it is far less inconvenient.

120. Phenol-Camphor Treatment of Suppurating Process.—Konjetzny says that he has been using this method of treatment for years for purulent phlegmonous processes and with good results. Chlumsky's original formula seems to him the best. This is 30 parts liquefied phenol and 60 parts triturated camphor with 10 parts alcohol. It is especially useful in pyocyaneus infection and tetanus, but there is danger of phenol poisoning if used too profusely in large cavities. He moistens gauze with the solution, wrings it out and covers the lesion with the gauze. He says we must not rely too implicitly on the alleged paralyzing of the phenol by the camphor.

Zentralblatt für Gynäkologie, Leipzig

November 7, XXXVIII, No. 45, p. 1393-1408

121 Dangers of the Stem Pessary. (Gefahren des Intrauterinstiftes.) A. Rieck.

November 14, No. 46, pp. 1409-1424

122 *Ultimate Outcome after the Schauta-Wertheim Operation for Prolapse of the Uterus. E. Clauss.

122. **Treatment of Genital Prolapse by Interposition of the Uterus.**—Clauss has compiled the statistics in regard to the Schauta-Wertheim operation for prolapse, repairing the pelvic floor with the uterus itself. Recurrence of the prolapse occurred in from 2.9 to 20 per cent. of the cases, and pregnancy followed the operation in two cases at Hamburg last year although the technic was supposed to have rendered this impossible. Further modifications are here proposed which will effectually sterilize beyond question. This method should never be used unless the woman is over 35 or 37 or already has several children or conditions are exceptionally serious. The history of 51 out of 62 cases is known for two to six years since the operation was done at the Hamburg clinic in question. A complete cure was realized in 72 per cent. In 7 others besides the 37 in this group the patients were free from all subjective disturbance but the anatomic conditions were not perfect. The improvement thus realized in 86 per cent. of the cases compares favorably with the results of other methods. One patient succumbed to sepsis; this case teaches the importance of healing up all old lacerations and erosions before attempting the Schauta-Wertheim operation.

Zentralblatt für innere Medizin, Leipzig

November 7, XXXV, No. 45, pp. 985-1000

123 Changes in the Blood during an Epileptic Seizure. (Zur Hämatologie des epileptischen Anfalles.) J. Löwy.

Gazzetta degli Ospedali e delle Cliniche, Milan

November 5, XXXV, No. 123, pp. 1893-1908

124 Malaria with Laryngeal Disturbance. (Malaria e laringismo.) G. Cremonese.

125 New State Regulations in Regard to Cattle and Meat. (Il nuovo regolamento di polizia veterinaria.) First part in No. 107.

November 8, No. 124, pp. 1909-1924

126 Compresses Kept Automatically Moist. (L'impacco permanente.) F. Steiner.

November 12, No. 125, pp. 1925-1940

127 Post-Diphtheric Polyneuritis. A. Carafoli.

November 15, No. 126, pp. 1941-1956

128 Opening Vein in Foot Cures Uremic Convulsions in Acute Nephritis. (Il salasso della vena pedidea nell'uremia cerebrale epilettica da nefrite acuta.) G. De G. Giunta.

Policlinico, Rome

Medical Section, XXI, No. 11, pp. 485-532

129 Alleged Antitryptic Power of the Blood-Serum. (Sul preteso potere antitriptico del siero di sangue.) G. Antonelli.

130 Roentgenography of the Sella Turcica in Relation to Disease of the Pituitary Body. (L'indagine radiologica della sella turcica in rapporto alle malattie dell'ipofisi.) L. Coleschi.

131 Fatal Acute Necrosis of the Pancreas. (Sulla morte per lesioni pancreatiche acute.) L. Lattes.

Riforma Medica, Naples

November 7, XXX, No. 45, pp. 1233-1260

132 *Nervous Diseases; 5,000 Dispensary Cases. R. Colella and B. Frisco.

132. **Nervous Disease at Messina and Palermo.**—Colella and Frisco found in 54 per cent. of the 5,000 cases reported that syphilis, alcoholism or tuberculosis in the parents was an important factor in the nervous diseases encountered. Only 20 per cent. were found free from signs of tuberculosis or syphilis. In 10 per cent. there were signs of both; in 40 per cent. tuberculosis alone and in 30 per cent. syphilis alone. Among the children with nervous affections, the tuberculin reaction indicated tuberculosis in 61.7 per cent.; syphilis in 23.8 per cent. and both of these in 14.7 per cent. Among 430 inmates of the Palermo Insane Asylum, the Wassermann reaction was positive in 18 per cent. Consanguineous marriages are also a factor in the nervous diseases; the parents were closely related in 30 per cent. of the 5,000 cases. Exophthalmic goiter was also frequent (92 cases) and goiter with secondary disturbances in 125 cases. The influence of heredity was particularly marked here; in some families the mother had had exophthalmic goiter before her marriage and some of the children developed it at an early age. They add that all these cases of simple and exophthalmic goiter came from one district with a single water supply. There were 123 cases of infantile spinal paralysis; they thus formed 21.7 per cent. of the 453 cases of spinal nervous affections. Tabes is comparatively rare, considering the prevalence of syphilis. Epilepsy is quite prevalent in Sicily; it formed 10 per cent. of the 4,276 patients with nervous disease, while neurasthenia was observed in 15 per cent. and hysteria in 11.8 per cent. The food, the lime in the water and the lack of exercise seem to be responsible for the unusual prevalence of the gouty diathesis in men and obesity in women.

Hospitalstidende, Copenhagen

November 18, LVII, No. 46, pp. 1369-1392

133 *Fat Tissue as Filling for Cavities in Bones. (Plombering af Knoglekaviteter med frit transplanteret Fedtvæv.) I. Svindt.

133. **Fat Filling for Bone Cavities.**—In Svindt's three cases the large flap of fat tissue was taken from the buttocks to plug a cavity left in the tibia after a process of syphilitic or tuberculous osteomyelitis. The patients were up in two or three weeks. The rapid healing and the perfect cosmetic effect are great advantages of this technic. The patients were two young women and a boy of 10. The largest chunk of adipose tissue, taken from the buttocks, measured 12x3.5x3 cm.; the next 9x2.5x3 cm., while the boy's flap was 6x2x2.5 cm. Each healed in place by primary intention and without reaction as the cavity was sterile; this method is scarcely applicable if there is still active infection in the focus. Its field is for old torpid lesions, such as syphilitic and ossifying osteomyelitis. Fistulas and secondary infection naturally contra-indicate it. Tuberculous processes can be treated in this way only when it is certain that all the diseased tissue can be removed.

Svenska Läkaresällskapets Handlingar, Stockholm

XL, No. 3, pp. 217-310

134 Intracranial Murmurs; Sixty-Six Cases. (Om kraniella bläsljud.) H. Köster.

135 *Chronic Polycythemia; Nineteen Cases. I. Hedenius.

135. **Chronic Polycythemia.**—Hedenius has encountered nine cases of polycythemia with pronounced pathologic conditions and also ten cases in which the condition otherwise seemed practically physiologic. He reviews the literature on polycythemia and gives the details of his nineteen cases. The high blood-pressure seems to be a complication and not a consequence of the polycythemia. In three cases the spleen became reduced in size during menstruation and the number of reds diminished. At other times they ranged from 6.1 to 14.5 millions in the first group and from 5.5 to 7.3 millions in the others. In five in the first group the figure was over 9 millions. All had different combinations of the typical symptoms, cyanosis, enlargement of the spleen and high blood-pressure, with the unusual numbers of reds. There was also a tendency to headache, slight dizziness, partial incapacity for work and restless sleep or somnolency, suggesting a cerebral-neurasthenic state. The hemoglobin percentage is relatively low so the hemoglobin index is low but the blood-producing organs show signs of exaggerated functioning. The proportion of mononuclears was also abnormally high. The low index explains why the polycythemia escapes recognition so long in so many cases. The course and nature of the chronic polycythemia seem to stamp it as a constitutional affection like gout, obesity and diabetes, and it is noteworthy that the gouty tendency was pronounced in eight of his nineteen cases. It is possible that epinephrin may have something to do with the exaggerated functioning of the bone marrow. Food poor in purins and iron seems to have a beneficial action on the subjective symptoms. Repeated venesection has given temporary relief in some cases. Roentgen exposures seem to reduce the number of reds for a brief period but exposures of the spleen have been known to aggravate the trouble. One case has been reported in which benzol was given for ten days in a daily dose of 1.5 gm. and both the subjective and objective symptoms grew worse under it. In this case, however, there were complicating pulmonary tuberculosis and nephritis. It is possible that benzol in certain cases may prove useful; a number of experiences confirming this possibility have been published. All other drugs used to date have proved disappointing. McLester gave benzol in one case for six months and the reds gradually subsided from 8,300,000 to 4,300,000. His dose was 3 gm. a day.

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